

# NETWORK WORLD

THE WEEKLY FOR LEADING USERS OF COMMUNICATIONS PRODUCTS & SERVICES

VOLUME 4, NUMBER 26

JUNE 29, 1987

## ► NETWORK EQUIPMENT TECHNOLOGIES

### NET scores contract coup

*Merrill Lynch deal involves up to 100 T-1 multiplexers.*

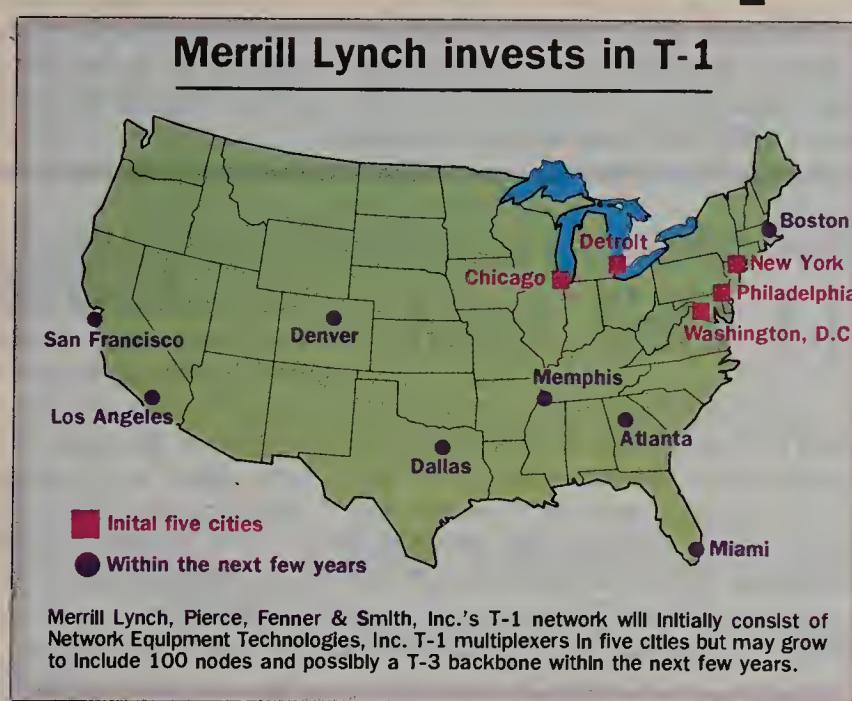
BY PAUL KORZENIOWSKI

Senior Editor

NEW YORK — In a bitterly contested fight, Network Equipment Technologies, Inc. (NET) has landed a lucrative T-1 multiplexer contract from Merrill Lynch, Pierce, Fenner & Smith, Inc., which could purchase as many as 100 multiplexers during the next few years.

The battle between NET and Digital Communications Associates, Inc. (DCA) for the megacontract stemmed from Merrill Lynch's decision last fall to replace an AT&T-provided T-1-based service with a network of dedicated T-1 multiplexers. Merrill Lynch officials were unavailable for comment last week on the status of the deal, but

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## SPECIAL SECTION: ISDN

### Early users mull merits of BOC trials

BY MARY PETROSKY

West Coast Correspondent

As trials of Integrated Services Digital Networks roll into public view and the first commercial implementations begin to show what's under the ISDN hood, it's clear that data applications are providing more fuel for experimentation than are voice applications.

Trial participants are avidly using ISDN for both local- and wide-area networking. Asynchronous terminal-to-host access, file swapping among personal computers, and even interactive 3270-type terminal-to-host communications are supported over ISDN lines.

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## NETWORK LINE

### News

► As expected, Timeplex unveils a high-capacity T-1 multiplexer and a net management system said to be part of the company's new networking architecture. Page 2.

NEWSPAPER

► To join or not to join the Corporation for Open Systems. That is the question the Tele-Communications Association is currently pondering. *Network World* has learned. Page 2.

► IBM and the University of Wisconsin join forces to develop OSI-compatible application layer software for

IBM's RT Personal Computer. Page 2.

► COMSAT and Contel decide to bury the hatchet and prepare to settle their aborted \$2.5 billion merger, a move that could result in the sale of COMSAT's international and manufacturing subsidiaries to Contel. Page 2.

### Features

► As ISDN approaches the starting gate, users must understand its technology and service potential in order to plan effectively for its use and its effect on network operations. See our inclusive primer. Page 37.

## ► LONG-DISTANCE RATES

### L.A. law raises ire of users

*Interstate call tax also hits carriers.*

BY MARY PETROSKY

West Coast Correspondent

LOS ANGELES — A new city ordinance placing a 10% tax on all interstate telephone calls originating in Los Angeles has pitted the cash-strapped city against large telecommunications users and long-distance telephone carriers, both of which question the tax's legality.

As of July 1, Los Angeles will extend to interstate dial-up calls a tax first levied in the early 1970s for intrastate calls. In addition, the city council is slated to meet tomorrow to consider extending the telephone tax to include international calls originating in Los Angeles.

The Tele-Communications Association (TCA), an association of communications users, and AT&T maintain that the tax places an undue burden on interstate commerce, and they argue that cities do not have the prerogative to impose such taxes. AT&T and MCI Communications Corp. are currently weighing their legal options.

AT&T is already involved in litigation in Colorado, where three suburbs of Denver have instituted a similar tax, according to Doug Kindrick, regulatory attorney for AT&T Government Relations.

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## ► LAN INDUSTRY

### Microsoft, 3Com to seal alliance

BY PAULA MUSICH

Senior Editor

NEW YORK — 3Com Corp. and software developer Microsoft Corp. are expected to announce a strategic alliance this week that observers believe will result in the joint development of a Microsoft local network operating system the two firms will try to promote as a standard.

Although both firms refused to release details about the announcement, Wes Raffel, 3Com's director of marketing for the software products division, said the alliance, which will include a "product transaction," is very significant for the two companies.

Industry observers expect the companies to announce

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## ► HIGH-CAPACITY NETWORKING

# Timeplex T-1 mux, net control system debut

BY JOSH GONZE

Staff Writer

NEW YORK, N.Y. — In a move aimed at bolstering its already sizable share of the multiplexer market, Timeplex, Inc. last week introduced a high-capacity T-1 multiplexer and a network management system touted as an implementation of a new networking architecture called Systems Connectivity Architecture (SCA).

Of late, Timeplex has been feeling heat from a new lineup of competitors including Network Equipment Technologies, Inc. (see "NET scores contract coup," page 1). Analysts say the new products are designed to bolster users' confidence in Timeplex and provide a migration path to advanced technology.

The new Link/100 is a high-capacity, nonblocking multiplexer that handles up to 144 T-1 links and 15,000 I/O channels at a single

node. The multiplexer features user-initiated switching, allowing users to select destinations by entering mnemonic addresses. Assuming compatibility, any terminal can communicate with any other terminal or host, and any host can communicate with any other host, Timeplex said.

Link/100 has a two-layer design, the hub layer and the I/O layer, each of which can be built up in modular fashion. A hub can consist of up to six separate multiplexer modules, each of which is an intelligent device supporting up to 28 T-1 lines and 2,500 I/O devices. Modules can be distributed at distances of up to seven miles using 125M bit/sec fiber-optic links in a

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## ► OPEN SYSTEMS SOFTWARE

# IBM, user build OSI tool

BY PAUL KORZENIOWSKI

Senior Editor

MADISON, Wis. — IBM is working with the University of Wisconsin at Madison to develop application layer software that conforms to the International Standards Organization's (ISO) Open Systems Interconnect (OSI) model and runs on the IBM RT Personal Computer.

Under a joint-study project initiated 2½ years ago, IBM's Academic Information Systems (ACIS) in Milford, Conn., and the university have been developing prototype software that conforms to middle- and upper-layer OSI standards and runs on top of the RT Personal Computer's Unix operating system.

Lawrence Landweber, one of seven professors at the university

working on the OSI project, said the software will also link middle- and upper-level OSI protocols to corresponding Transmission Control Protocol/Internet Protocol protocols used on the Defense Data Network. He said the OSI protocols are close to completion and could be shipped to beta sites by the fall.

The project represents the second time IBM has worked with the university to develop prototype network software. A few years ago, the university designed TCP/IP protocols that ran on top of

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## ► MERGER MOP-UP

# Contel may purchase COMSAT units

BY KARYL SCOTT

Washington, D.C. Correspondent

WASHINGTON, D.C. — Officials at Contel Corp. and Communications Satellite Corp. confirmed last week they are on the verge of set-

ting their aborted \$2.5 billion merger, the result of which could be the sale of COMSAT's international and manufacturing subsidiaries to Contel.

While spokesmen from both companies declined to elaborate on

the terms of the anticipated settlement, Contel Chairman Charles Wohlstetter recently said the company might be interested in purchasing COMSAT's international division and a few of its other non-regulated subsidiaries.

These subsidiaries include COMSAT International Communications, Inc., which provides international voice and data services for private network users, and COMSAT Technology Products, which manufactures very small aperture terminal satellite equipment and time-division multiplexing gear.

Other divisions that may be bartered away include COMSAT Government Services, which sells network services and communications systems to the federal government; COMSAT Technology Services, which provides consulting services

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## ► USERS GROUPS

# TCA may join COS as affiliate

*Users group weighs nonvoting status.*

BY MICHAEL FAHEY

Senior Writer

SAN DIEGO — The Tele-Communications Association (TCA) is considering joining the Corporation for Open Systems (COS) as a nonvoting affiliate member, *Network World* has learned.

The user organization, headquartered here, will not reach a final decision on whether to become an affiliate member of the standards steering organization for at least several months, according to TCA President Lionel Gillerman. He said membership in COS will be studied by several TCA committees before the TCA corporate board makes a final decision on whether to join. (For other COS coverage, see "COS signs DOD group and Nynex," page 19.)

Currently, COS' affiliate members include the Network Users Association, the Association of Data Processing Service Organizations, the Computer Business Equipment Manufacturers Association, the Network Computing Forum, the Institute for Defense Analysis and the National Association for State Information Systems. The International Communications Association (ICA) is also considering joining COS as an affiliate member. An ICA official said the organization's decision has been deferred follow-

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**Correction:** The article entitled, "Banks weigh COS pitch" (NW, June 8) incorrectly quoted Ted Manakas, information products manager for the Corporation for Open Systems (COS), as saying he expected 25 or 30 banks would join the organization as a result of COS' industry-specific recruitment program. Manakas said he hoped that number of banks would attend an upcoming briefing at COS headquarters.

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**TELECOM TRENDS**

Amway will be offering a lot more than soap as partner Amvox signs a pact to sell Centigram voice-messaging systems through Amway's distributors. **Page 13.**

**DATA DELIVERY/NET MANAGEMENT**

Members of the ISO say the OSI network management framework should be approved as a draft international standard, bringing it

closer to full standard status. **Page 15.**

**LOCAL NETWORKING**

The NetCommander low-end data switch gets lukewarm reaction from two early users. **Page 17.**

**COMMUNICATIONS MANAGER**

A telecommunications chief for the federal GSA says the status of communications managers is rising as they become more knowledgeable about their organizations. **Page 17.**

**NEW PRODUCTS AND SERVICES**

New products for local and token-ring networks, T-1 enhancements and VSAT net management provided some bright spots at the downsized NCC. **Page 23.**

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## NETWORK WORLD

### Call to readers

*Network World* wants to make its news coverage even better, and for that we are asking for your help. If you learn about an interesting event that just occurred or is about to occur, please give us a call.

We'd also like to hear about unusual network applications and how you're optimizing your networks for performance or savings. Call *Network World* Editor Bruce Hoard toll free at (800) 343-6474, ext. 332.

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## ► MFJ MODIFICATIONS

# Greene to hear views about RBHC freedoms

BY KARYL SCOTT

Washington, D.C. Correspondent

WASHINGTON, D.C. — U.S. District Court Judge Harold Greene will hear oral arguments this week regarding the Department of Justice's recommendation to remove the Modified Final Judgment restrictions that have governed the regional Bell holding companies' activities since the divestiture of AT&T.

Oral arguments are the last chance for the RBHCs and other interested parties to plead their cases before Greene and are the final step in the triennial review of the Modified Final Judgment.

At the end of the hearings, Greene will decide whether the RBHCs should be allowed to enter the long-distance, information service, equipment manufacturing and nontelecommunications markets, markets that have been off-limits to the RBHCs since the Modified Final Judgment was agreed to in 1984. The three-day marathon hearing is expected to yield little new information beyond arguments already presented in voluminous written comments filed with the court earlier this year.

The RBHCs argued in written filings that increased competition in the telecommunications industry, coupled with their need to diversify in order to remain financially viable, justify the removal of the Modified Final Judgment restrictions.

The RBHCs hope Greene will allow them to offer information services such as videotex, voice messaging and data transmission services. They also want to provide end-to-end voice and data services to large corporate customers both within and outside their local operating regions.

The purpose of oral arguments is to allow Greene to question attorneys for the various interest groups in the hopes of "elucidating points that are perhaps unclear and to fill in some previous omissions," said Greene's law clerk, Julie Dahlberg.

Few of the attorneys appointed to speak before Greene would elaborate last week on what they plan to tell the judge, largely because most of the comments will be extemporaneous.

James Blaszak, attorney for the Ad Hoc Telecommunications Users Committee, will speak on behalf of

his group and the Committee of Corporate Telecommunications Users, International Communications Association and Telecommunications Association, among others.

Blaszak will address the information services issue and "argue in favor of retaining the current restrictions," he said.

The hearings will be broken down into four categories. On Monday morning, Greene will hear arguments on the interexchange restriction; Tuesday morning, the manufacturing prohibition; Tuesday afternoon, the nontelecommunications business limitation; and Wednesday morning, the information services prohibition.

AT&T would not elaborate on what attorney Howard Trienens will tell Greene other than to say, "AT&T feels nothing has changed since the Modified Final Judgment prohibitions were put in place," said AT&T spokeswoman Edith Herman. "We are still opposed to allowing the RBHCs into the long-distance and equipment manufacturing businesses. We do not oppose allowing the RBHCs into the information services market."

Nynex Corp. attorney Raymond Burke will address the long-distance question on behalf of all the RBHCs, said Nynex spokesman Richard Adler. "We are going to argue that the combination of competition in the interexchange market and technological advancements make the Modified Final Judgment restriction unnecessary." □

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## ► NETWORK CONTRACTS

# Finance firms tab VSATs

BY JIM BROWN

New Products Editor

Two lucrative VSAT satellite network contracts were awarded by financial service firms in separate deals last week, one by Prudential-Bache Securities, Inc., the other by Computer Power, Inc.

Prudential-Bache of New York inked a \$10 million contract with Atlanta-based Tridom Corp. and GTE Spacenet Corp., based in McLean, Va., to build a very small aperture terminal network to link 300 branch locations throughout the U.S. to the company's data center in New York.

The two-way satellite network will replace 150 multidrop leased lines. It is expected to lower Prudential-Bache's \$4 million annual communications budget by 40%, according to William Rich, vice-president for telecommunications. Currently, 20 beta test sites are in operation. The remaining sites are expected to be on-line by December.

Prudential-Bache will use Tridom's Clearlink Host Interface to route traffic from the company's host computer to GTE Spacenet's downtown New York satellite hub over leased lines. The hub will broadcast data and teleconferencing video images to GTE's Gstar 2 satellite. Tridom's Clearlink Station antennas will receive all data

broadcasts, but the microprocessor-based Clearlink Indoor Unit will accept only data addressed to that branch.

Computer Power of Jacksonville, Fla., which processes mortgages for 150 financial institutions nationwide, signed a \$6 million to \$8 million contract for a VSAT net with Germantown, Md.-based M/A-Com Telecommunications Division, Inc. M/A-Com will provide the gear to link those financial institutions to Computer Power's data center in Jacksonville.

A single 8.1-meter M/A-Com master hub in Jacksonville owned

## ► NET MANAGEMENT

# Cincom bolsters tool

BY PAUL KORZENIOWSKI

Senior Editor

CINCINNATI — Cincom Systems, Inc. last week announced enhancements to Net/Master, its modular, host-based network management software, that allow it to monitor and control MVS operating system operations as well as communications subsystems and other software components.

A new Net/Master component, Sys/Master, enables an operator to manage from a single terminal

complete system operations, including the operating system; network systems such as IBM's VTAM; and subsystems such as IBM's CICS, TSO and Job Entry System. The additional Net/Master component was introduced one week after IBM announced a number of enhancements, including a Sys/Master-like component, to its host-based network management product NetView.

Vicki Duckworth, product manager at Cincom, said customers

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## ► TRAVEL SERVICES

# Europe responds to U.S. reservation nets

BY JIM BROWN  
New Products Editor

PARIS — In response to inroads that U.S.-based travel reservation systems are making with European travel agents, a group of four European airlines announced plans here last week to develop a network to provide flight, hotel and car reservation services to travel agents by mid-1989.

Air France, Scandinavian Airline Systems, Lufthansa and Iberia will invest a total of \$300 million to establish a holding company with an estimated staff of 550 that will build, operate and market the Amadeus network and its services.

The holding company, based in Spain, will control a West Germany-based company that will operate the network, a France-based company that will develop network applications and other services, and a Spain-based marketing arm, which will sell the Amadeus network to travel agents.

Sources say roughly \$140 million of the investment will be used to swap the Unisys Corp. computer equipment used by each of the four airlines for new IBM hardware and software.

A second European airline group, headed by British Airways and Swissair, said it will announce plans on July 10 to develop another

reservation network for European travel agents. That plan, which also has the support of KLM Royal Dutch Airlines and Austrian Airlines, may become an alternative to Amadeus. This group and most other European air carriers already use IBM equipment.

All eight airlines are among the 21 members of the Association of European Airlines (AEA), which has been studying the feasibility of creating a single European reservation network for the past year. Currently, the 21 AEA members run 10 separate reservation systems, most of which are limited to individual airlines within national borders.

According to Karl-Heinz Neuemeister, secretary-general of the AEA, that \$500,000 study recommended the formation of one giant European reservation system. The study was prepared by a staff of roughly 80 AEA members with the New York-based transportation consulting firm Simat Helliesen & Eichner, Inc. acting as project management.

"The conclusion was that since we cannot see computer reservation systems bound to just national markets, it would be wise to jointly build one European system," Neuemeister said. That conclusion was presented to AEA members last May when the Amadeus group and the British Airways- and Swissair-led group announced they would

develop plans to build that network.

Speaking from AEA headquarters in Brussels, Belgium, Neuemeister said, "We have two camps that have taken the initiative to build the network." Both camps will present their proposals to AEA members on July 10. It is possible, he said, that both groups will combine their separate plans into a single European reservation network. On the other hand, AEA members sitting on the sidelines may decide which of the two teams they will join.

The undertaking is clearly in response to the introduction of United Air Lines' Apollo and American Airlines' Sabre reservation system services to European travel agencies. "Apollo and Sabre are really not in any great shape or form right now in European travel agencies," said Michael Friedman of Simat Helliesen & Eichner, Inc. "But I think concern about what the U.S. computer reservation systems might do — and clearly have the ability to do — in the future is one thing that drove [European air carriers] together," he continued. "Europeans can't get together on anything unless the Americans threaten them."

Although Amadeus network plans have not yet been fully developed, it appears the first step will be to connect all four of the air carriers' reservation systems. □

## L.A. law raises ire of users

continued from page 1

In a letter to the Los Angeles mayor and city council members, the TCA said, "You should be aware that the FCC has consistently preempted state and local jurisdiction in matters regarding imposition of surcharges on interstate services when those charges unnecessarily burden interstate communications services."

The tax on interstate calls would raise approximately \$16 million per year for Los Angeles, according to Richard Dawson, assistant city attorney. But MCI and AT&T believe the city has underestimated that figure. AT&T estimates its share of the taxes on interstate calls could reach nearly \$19 million. Revenues could rise to more than \$22 million if international calls are included, Kindrick said.

Besides concern about a hike in their bills, users say they fear that other California municipalities will jump at the chance to raise new monies via similar taxes. As in many other states, California has a series of state laws that limit taxes, so municipalities are looking for other ways to fill their coffers.

More ominous even than the tax itself "is that once Los Angeles does it, we know other cities around here are going to look at it as an easy 10%," said Robert Hynes, telecommunications engineering manager for the *Los Angeles Times*. Already, neighboring Culver City and Santa Monica, Calif., are considering just such a move, according to MCI's Larry Kamer, senior manager of government relations for MCI.

The tax bite could be especially painful to large corporations whose telecommunications bills run in the hundreds of thousands and even millions of dollars, said Lionel Gillerman, TCA corporate president. Gillerman and Hynes

both said they expect companies with sufficient resources will set up private networks with switches in other cities and bypass Los Angeles.

"Tax avoidance is what everyone is going to look at," said MCI's Kamer. One large MCI customer is already looking at ways to reconfigure its network, while another is looking to move all traffic onto its satellite network.

The new tax will be collected by long-distance carriers and remitted to the city. AT&T and MCI contend that the 30 days they were given to change their billing systems to accommodate the tax is insufficient. AT&T and MCI both said they need at least 90 days.

As originally passed, the ordinance requires carriers who cannot meet the July 1 date to back-bill customers. "That is a problem of tremendous proportions," Kamer said. The carrier estimates it will cost \$100,000 to change its billing procedures in order to collect the new tax. If required to back-bill customers, MCI could face \$1 million in costs, Kamer said.

"We either absorb the expense, which MCI is not in a position to do, or pass it on to our customers, which we're not going to do," Kamer said. Both MCI and AT&T believe the city of Los Angeles should bear the responsibility for these costs.

At its meeting tomorrow, the city council is also scheduled to consider the issue of the carriers' ability to implement the necessary changes, Dawson said.

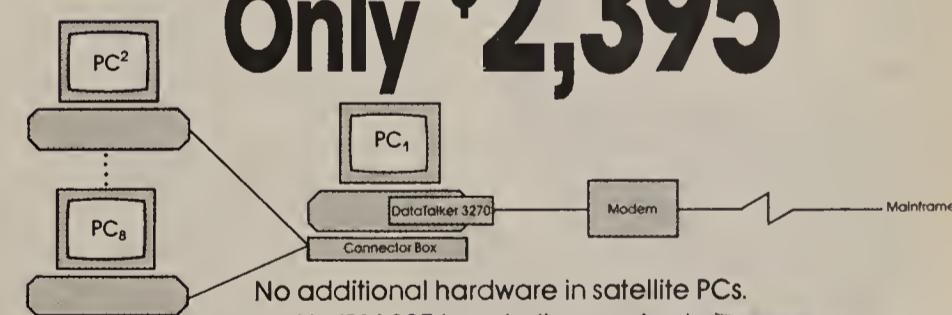
AT&T is hoping that a settlement in yet another case, in which the state of Illinois has imposed its state sales tax on interstate telephone services, will provide overall guidelines in the tax area. "We're hoping that case will go all the way to the Supreme Court so that we'll resolve this issue once and for all," Kindrick said. AT&T is not involved in that litigation. □

"Tax avoidance is what everyone is going to look at," said MCI's Kamer.

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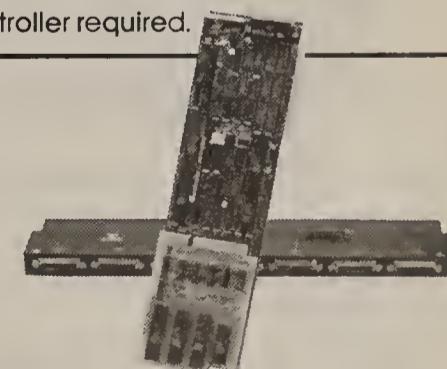
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## Timeplex mux, system debut

continued from page 2

bus topology. The I/O layer consists of Link/100 ports and ports of smaller Timeplex multiplexers — Link/1s and Link/2s — interfaced at T-1 speeds.

The Link/100 supports all the same voice encoding techniques as Timeplex's former top-of-the-line multiplexer, the Link/2, including pulse code modulation (PCM), adaptive differential PCM, continuously variable slope delta modulation and packetized voice. Link/100 also supports submultiplexing for data applications, enabling users to make more efficient use of the 64K bit/sec DS0 channels within T-1 1.54M bit/sec digital transmission pipes.

Analysts briefed on the announcements were impressed, characterizing Timeplex as a solid competitor out to provide its customers with a migration path. "Timeplex has a major portion of the multiplexer market, but they had to move up into the higher end, and this looks like an attractive product," said Mary McCaffrey, vice-president at C.J. Lawrence & Company, Inc., a Wall

Street research brokerage firm.

Charles Nichols, first vice-president at E.F. Hutton & Company, Inc., said, "Something that big certainly shows people that there is a migration path for new and existing users. They certainly don't ever have to worry about capacity being a problem."

The Link/100 is priced at between \$100,000 and \$800,000, fully configured, and will be delivered in three phases, the last of which will be summer 1988.

Timeplex also introduced a communications architecture dubbed Systems Connectivity Architecture (SCA) to demonstrate an overall strategy for tying Timeplex multiplexers to other network components.

SCA establishes a framework for network interconnections and growth, and defines rules for interaction between private and public segments of hybrid networks.

Timeplex announced a network management package called Time/View as an implementation of SCA.

Time/View's capabilities include monitoring and alarms, network,

node and segment status, selectable alarm processing, trouble reports, alarm profiles and history file, trouble ticketing, diagnostics, and configuration tools.

Time/View's architecture provides both for hierarchical, or central, and regional management of various network nodes. A central controller, running on a Hewlett-Packard Co. 9000 series minicomputer, is connected to remote controllers based on Timeplex-supplied microcomputers called Model 100s. Model 100s can function stand-alone or in conjunction with other Model 100s linked to a central controller.

The Time/View net management package includes Link/View, Timeplex's bridge to IBM's NetView/PC, the gateway for all non-IBM equipment to NetView. NetView is IBM's network management system. Timeplex officials positioned Time/View as a NetView support system.

The regional controllers will be available in September at a price of \$2,500, not including the Model 100 microcomputer. Central controllers will be available in December and will be priced at \$30,000, software only. □

## TCA may join COS

continued from page 2

ing the recent departure of ICA Executive Director Stephen Christie.

The affiliate membership category was instituted in January to allow users groups and associations to participate in COS activities without paying the \$25,000 to \$200,000 annual fee for full, voting membership. Affiliate members pay a \$500 annual fee.

Affiliate members are not allowed to attend COS' bimonthly Strategy Forum sessions, where full members decide policy and strategy issues. Affiliate members are also barred from attending meetings of COS' Users Committee, made up of user companies and organizations that are full members of COS.

TCA President Gillerman said he questioned how much influence TCA would have on COS if it joined the organization only as an affiliate member.

"Being realistic, the big money [in COS] is coming from the big vendors who are designing systems. But we are the ones who will be using the equipment," said Gillerman, who added that he is keeping an open mind on the pros and cons of joining COS until the TCA committees have evaluated the issue of membership.

According to Gillerman, the TCA bylaw committee will determine whether or not the organization's rules allow it to join COS. In the likely event that the bylaws permit TCA membership, he said, the question will go to the TCA member services committee, which will study the benefits of joining COS and make a recommendation to TCA's 13-member corporate board.

TCA member William Moore said the issue of whether the user organization should join COS is a complicated one that bears study. "My company, Boeing [Computer Services Co.], is already a full member of COS," Moore said. "But, many TCA members work for small companies that have no interest in COS. This is a good issue for the committee to study."

Ted Manakas, information products manager for COS, confirmed that TCA had requested information about joining the group as an affiliate member and added that COS would welcome TCA's membership. "The affiliate membership is a way to expand the user base of the organization," he said.

COS has 17 user companies that are full members of the organization. Manakas said COS hopes to tie the full user members to the affiliate members more closely in order to increase end-user influence on the organization. He said the organization is currently discussing the best way to accomplish this.

In addition, Manakas said, closer ties with affiliate members could encourage some of them to become full members. "The affiliate base is another way of communicating with users to get them to see what benefits they could derive from COS. And, of course, it could add to the membership of COS." □

## Microsoft, 3Com alliance

continued from page 1

that 3Com will join in Microsoft's effort to develop its LAN Manager, a network operating system designed for IBM's OS/2. The Microsoft-developed OS/2 is the system's software intended for use with IBM's new Personal System/2 microcomputer.

Observers further speculate that 3Com and Microsoft will try to establish the LAN Manager as the local network standard for the IBM Personal System/2.

Microsoft announced the LAN Manager on April 2 in conjunction with IBM's introduction of the Personal System/2 and OS/2. The software, which provides a platform for the development of distributed applications in network environments, provides for file and printer sharing, security features and network administration tools.

"I think the message will be that the two companies are driving a stake in the ground and saying this is the local network operating system standard," said a source close to Microsoft who asked not to be named.

Microsoft's Dave Melin, product manager for the LAN Manager, acknowledged the close working relationship that has developed between the two firms.

Industry observers maintain that Microsoft needs 3Com's help in developing the program to work effectively with distributed applications, a key concern if the companies hope to establish the LAN manager as a de facto standard.

"The LAN Manager is a strategically important product to Microsoft," said Rick Kimball, a research analyst with Montgomery Securities in San Francisco. "Microsoft has its hands full developing OS/2

itself, and 3Com brings a lot to the table in terms of understanding networking." The LAN Manager, scheduled to be released to developers and OEMs in the fourth quarter of this year, is rumored to be behind schedule in development.

Robert Clark, vice-president in the consulting division of The Seybold Group, Inc., expressed doubt about Microsoft's ability to deliver the LAN Manager on schedule without the help of 3Com's networking expertise. "3Com has been moving in that direction and has the expertise to make it happen within the time frame," he said. "I think that's what's bringing the two companies together."

The unnamed source said, however, the LAN Manager is much further along than people believe.

Sources who say Tuesday's announcement will represent the kickoff of a joint crusade to establish the LAN Manager as the networking standard for IBM's Personal System/2 point to IBM's silence on whether it will adopt the LAN Manager for the PS/2 line and to Novell Inc.'s dominance in the market.

"Microsoft and 3Com have an interest in defining a standard they can push," said the source close to Microsoft. IBM has not endorsed the LAN Manager, and it seems doubtful that Microsoft would succeed in marketing a network operating system on its own.

Microsoft also faces stiff competition in the network operating system market from Novell, which will push its NetWare network operating system as an alternative to OS/2-based networking systems.

3Com, which is contractually barred from discussing the announcement or responding to speculation, was allowed to deny rumors of a possible merger between the two companies. □

## Cincom bolsters tool

continued from page 4

wanted a tool that would enable them to manage all of their computer system requirements from a single terminal. Some large customers have as many as 20 terminals controlling various parts of a computer systems operation.

Sys/Master enables an operator to automate routine MVS control procedures. MVS continually presents an operator with systems messages, many of which are not needed by particular users. With Sys/Master, an operator could write a procedure to show only those messages needed.

Sys/Master can perform other functions, such as automatically running a set of MVS commands. For example, a program on one host could be waiting for a free tape drive while a drive on a second host was free. With Sys/Master, a user could write a routine that would automatically send the job to the free drive.

Large customers are also demanding additional automation capabilities from their management systems because they do not have enough trained technicians to support rapidly expanding networks, according to Larry Timmins, research analyst at the Gartner Group, Inc., a Stamford, Conn., market research firm. He predicted the need for such technicians could grow threefold by 1990. By automating mundane system and network management tasks, companies may be able to reduce the need for additional personnel.

Sys/Master runs under IBM's MVS or MVS/XA operating systems, requires 1M byte of random access memory, costs \$30,000 and will be available in the third quarter. □

## NET scores contract coup

continued from page 1

sources said ink was drying on a contract with NET.

In March, Michael J. Morse, assistant vice-president of network engineering at Merrill Lynch, outlined the company's plans to *Network World*. Merrill Lynch currently supports two backbone networks. One, known as MerNet 1, is a T-1 network linking the company's New York offices and supported by multiplexers from a mix of vendors, including General DataComm, Inc. and Timeplex, Inc.

The second network, called MerNet 2, is a nationwide T-1 network of 20 T-1 spans used to support the voice and data requirements of 14 Merrill Lynch regional offices. The Merrill Lynch network was installed in April 1985 with a great deal of fanfare. It was the first installation of a new service from AT&T called Customer Controlled Reconfiguration (CCR).

With CCR, AT&T demultiplexes T-1 facilities into 24 64K bit/sec voice/data channels at one of its central office switch locations and passes the individual channels on to the customer. The customer can enter network change requests using a terminal.

MerNet 2 will be replaced with a private network of NET Integrated Digital Network Exchange multi-

plexers, creating MerNet 2 Plus.

One of the primary reasons for phasing out AT&T CCR service, according to Morse, is to be able to respond quickly to changing communications needs. "We have a new priority application that immediately requires installation of 700 data channels," Morse noted.

In a CCR environment, such drastic alterations require a lead time of a few months, Morse said. Merrill Lynch's private T-1 network will be able to implement changes much more quickly.

Use of dedicated T-1 multiplexers also enables the company to utilize bandwidth better. For example, under CCR, a 9.6K bit/sec link would require a complete 64K bit/sec channel within a T-1 pipe. In a private network, the line would use only 9.6K bit/sec of 1.54M bit/sec T-1 bandwidth.

Also, CCR is not as responsive to network problems. If a CCR user wanted to switch a channel from a troubled line to a second line, 15 to 20 minutes might pass before AT&T could make the change. With T-1 multiplexers, a user can instantly alter a channel.

During the next few years, additional nodes could be installed in Boston, Atlanta, Dallas, Denver, Los Angeles, San Francisco, Miami and Memphis, Tenn., according to Morse. If the nationwide network is successful, Merrill Lynch may also merge MerNet 1 with MerNet 2

Plus. "In a few years, we could have 75 to 100 nodes on a nationwide network," Morse said.

The backbone of the nationwide net may carry sufficient traffic to warrant upgrading to T-3 lines, which are 45M bit/sec facilities that provide the capacity of 28 T-1s. "Moving to T-3 lines is a distinct possibility for us," Morse said. "T-3 tariffs are dropping, and a user with eight T-1 lines may be able to justify a T-3 line."

Linking the two networks may result in the single largest backbone network controlled by one vendor's T-1 multiplexers, a fact that had the attention of many key T-1 multiplexer makers. Last fall, NET, DCA, Avanti Communications Corp. and Timeplex were all pitching for the contract. Morse said only these four companies had a multiplexer capable of supporting the company's anticipated networking needs.

In January, Merrill Lynch eliminated Avanti and Timeplex from the competition. Neither company was able to deliver the capabilities needed, even though both planned to announce high-end multiplexers that could meet Merrill Lynch's needs. "We didn't want to be involved in beta testing any new equipment," Morse explained.

Key selling points of the equipment from the remaining contestants, NET and DCA, were backup and redundancy capabilities. "In

our business, if we are down for even a few moments, we can lose hundreds of thousands of dollars," Morse said. NET and DCA both offer an alternate routing capability, which will automatically switch T-1 lines around a failed node.

For the past six months, NET and DCA waged a fierce fight for the new business, the upper hand constantly changing. Although NET already had an impressive stable of customers, including American Airlines, Inc., Electronic Data Systems Corp. and MCI Communications Corp., the company deemed Merrill Lynch an important account.

DCA needed a customer like Merrill Lynch to gain market credibility. The company has been doing a good job winning medium-sized accounts, customers with six to 10 T-1 lines, but has not landed a leading-edge account like Merrill Lynch, according to analysts.

Morse said the final decision was very difficult because the two products offered similar capabilities. Although Morse would not specify why he picked NET over DCA, observers close to the deal said Morse probably found NET's product line a bit more robust than DCA's multiplexers. NET, for example, is delivering dynamic bandwidth features that could significantly cut Merrill Lynch's communications costs. DCA has yet to deliver such a feature. □

## IBM crafts OSI software

continued from page 2

IBM's VM operating system.

For two years, the university offered the TCP/IP code to other academic institutions for a nominal fee of \$500. Landweber said approximately 100 universities took part in that program. A few months ago, IBM offered its first commercial TCP/IP product for the VM operating system, and that product was based on enhancements IBM engineers made to the original university code.

As the TCP/IP project began winding down, the OSI work was discussed as a possible follow-up project. Landweber was working on a National Academy of Science committee examining TCP/IP vs. OSI issues for the Defense Department. He convinced IBM to fund a second project, which will result in the OSI software.

The IBM RT Personal Computer was designed to meet the needs of users in the academic community, which has traditionally opted for Digital Equipment Corp. equipment. The second project would test how easily TCP/IP and OSI software could be mixed on academic networks. The project links Personal Computer RTs on local- and wide-area networks through TCP/IP software, which has emerged as a de facto standard in the academic community.

Landweber was not sure how IBM plans to use the prototype OSI protocols. ACIS is a marketing arm designed to broaden IBM's presence in the academic community,

according to Ken Creecy, director of communications project management at ACIS. The group complements IBM's internal research by funding a broad range of academic projects. Creecy added that each project could lead to the development of an IBM product but that such an outcome is not guaranteed. He said he was not sure of IBM's plans for the OSI software.

Landweber said he hopes IBM will distribute the code to universities at the beginning of next year. "Universities will not have to go through their own product development cycle to work with OSI software," Landweber said. He added that universities are interested in working with prototype OSI software since they expect an eventual migration from TCP/IP to OSI.

With the ISO project winding down, Landweber approached IBM with a third possible project: working on OSI and TCP/IP network management issues. "There are a number of outstanding questions that need to be answered," he said. "For example, how one gathers network management data and what sort of control one has over a remote network." Creecy said IBM is talking with the University of Wisconsin and a number of other academic organizations about a variety of new projects.

Landweber found linking TCP/IP software to OSI software easier than anticipated. "Our experience illustrates that one can run both sets of protocols on one network without any conflicts," he said. "We think there will be a gradual transition from TCP/IP to OSI." □

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## Contel may purchase

continued from page 2

to private network users; and COMSAT General, which provides video transmission services.

In addition to Contel agreeing to acquire some of COMSAT's money-losing subsidiaries — COMSAT nonregulated subsidiaries lost \$20 million last year on revenue of \$200 million — COMSAT is expected to receive a cash settlement from Contel. Company spokesmen would not reveal the amount.

Representatives from the two companies have been meeting daily to hammer out a settlement of the aborted merger attempt. COMSAT spokesman Richard McGraw said, "The two companies have been meeting since April, and we expect to announce a settlement any day now."

The merger, announced last September, would have formed a \$6.6 billion company. Contel provides transmission services and sells private networks and network equipment. COMSAT provides domestic and international satellite services, private network design services and telecommunications equipment. COMSAT is also the U.S. signatory in the International Telecommunications Satellite Organization, an international consortium that provides satellite services.

Both firms initially thought they would increase their market share through the marriage, which would have provided Contel with access to international markets and COMSAT with a strong financial partner.

Contel's realization that COMSAT's financial stability could be affected by several pending regulatory actions caused it to pull out of the deal in April. The most damaging FCC action requires COMSAT to refund

\$62 million in overearnings to customers.

Industry analysts said the proposed settlement is a logical resolution to a nasty dispute.

"It makes sense for Contel to buy the COMSAT subsidiaries, especially the international division," said Gerald Mayfield, president of the DMW Group in Stamford, Conn.

COMSAT International would be a good match for Contel ASC, which provides satellite business services, Mayfield said. Other Contel divisions sell VSATs and communications systems to the government. "There are a lot of synergies between the two companies," Mayfield said.

"Contel has stated that one of its goals is to move into the international communications arena," said William Rahe, vice-president of Gartner Group, Inc., also in Stamford. "Acquisition of COMSAT International would certainly give Contel a good position abroad. COMSAT is a well-recognized name overseas and has working relationships with most of the foreign PTTs. In fact, one of the reasons Contel originally decided to merge with COMSAT was to gain an international presence," he said.

Another industry observer said he doesn't see the sense in Contel acquiring COMSAT's subsidiaries. "Contel is already in the same businesses as these COMSAT subsidiaries. I don't know what Contel is going to gain except maybe a settlement to a very difficult and messy dispute," said a satellite analyst who asked not to be identified.

Settlement of the dispute could improve Contel's and COMSAT's public images. "Both companies got a lot of negative publicity over this thing," Mayfield said. "An amicable settlement in which both companies come out ahead could help them save face." □

## ADCU remains true

continued from page 1

and integrated voice and data networks.

ADCU fosters information exchange through a variety of means, including an annual conference — this year's meeting gets under way here this week. But ADCU is struggling to become truly national in scope, to grow beyond its core membership in the Northeast and increase its membership rolls west of the Mississippi, according to ADCU Executive Director August Blegen.

Over the years, ADCU has focused much of its attention on regulatory activities. ADCU submitted comments on behalf of its users during the divestiture process and presented user concerns during the Modified Final Judgment process and the Second and Third Computer Inquiries.

The group has also submitted comments stating the user viewpoint during various tariff and access charge hearings, and during discussions on the Open Network Architecture and the Huber Report, according to John Comptello, chairman of ADCU's public policy committee.

In the past several years, the group has taken a more active role in the standards-making process.

For example, ADCU is currently the only user organization that is a voting member of the American National Standards Institute's T1D1 committee, which is developing Integrated Services Digital Network standards, said W. Edward Hodgson. Hodgson is chairman of ADCU's standards committee and manager of computing and communications at the Livingston, N.J., computer center of Westinghouse Electric Corp.

ADCU was incorporated in New York state by five corporate telecommunications managers looking to share information on data communications. Initial member companies included Eastman Kodak Co., American Airlines, Inc., Chase Manhattan Bank, N.A., Equitable Life Assurance Society of the United States and Damon Corp.

"We picked a somewhat narrower niche than ICA, which was initially voice-oriented," said Lewis Haring, incoming ADCU president, and vice-president in network planning at Chase Manhattan Bank. "We were early to recognize the idiosyncrasies of data, and we specialized in that area," he said, adding that no other user organization was then specifically addressing data communications.

Today, the association has approximately 240 member companies, including a large number of banks, financial institutions, insurance companies, universities and utility companies. The association's individual members number 275. Member firms pay \$200 per year dues; individual members pay \$100 per year.

"ADCU is aimed at fostering information flow to professionals working for companies that are major data communications users," Haring said.

That flow of information is accomplished through the group's annual conference and bimonthly regional meetings, a hefty 50-page bimonthly newsletter and, most recently, an electronic bulletin board system, which is still in its pilot stages.

**"ADCU is aimed at fostering information flow to professionals working for companies that are major data communications users," Haring said.**

The association also distributes both a membership roster and member profiles. The profiles outline each member company's data communications operation, including hardware, terminal types, networks and vendors used.

"We're effective in providing an internal network whereby members can discuss common problems and exchange experiences," Haring said. "There's no substitute for experience; you can't buy that kind of insight."

ADCU members are concerned about "a better technical solution for whatever it is they're trying to solve," Blegen said. Several ADCU members noted that the group offers a strong technical program during its annual conference.

ADCU member Harold Dellinger plans to bring representatives from his local telephone company to an association meeting so they can gain more insight into data communications users' needs.

Dellinger is senior telecommunications analyst for Bloomington, Ill.-based Country Companies Services, Inc., the data pro-

cessing and telecommunications arm of the Country Companies insurance group in Illinois.

Despite its success in helping members, ADCU is having problems expanding membership beyond its stronghold in the Northeast.

The association currently has only four regions that regularly hold meetings: New York, New Jersey, Boston and Minneapolis-St. Paul, according to Blegen. "Our membership is poor west of the Mississippi," he said.

Illinois member Lee Harness of North Illinois Gas Co. in Aurora, said he'd like to see a regional chapter started in Chicago, but he admits he doesn't have the time to set it up himself. A lone San Diego member recently decided to drop out of the association because of the lack of ADCU activities on the West Coast.

"I think the association has a future, and I hope it expands quickly so we can join again," said this telecommunications manager, who asked not to be named.

ADCU's biggest challenge is to continue to grow in a field that has become virtually overpopulated with different associations, many of which are now addressing data communications concerns, noted Michael Kanthal, outgoing ADCU president and vice-president of corporate telecommunications at Citibank N.A., New York.

"The toughest thing we fight is just becoming better known," Kanthal said. He and other officers also echoed a common concern about the difficulties of motivating members to become active participants in the association.

Kanthal is particularly disappointed in the apparent lack of interest among users — both inside and outside ADCU — in the standards-making process. "It's a virgin territory and yet such an important area for users to get involved in. But I constantly shake my head that they're just not doing it," he said.

Hodgson, the ADCU standards committee chairman, noted that the association could attend many more standards meetings if only more members would get involved.

ADCU's role on the T1D1 committee, for example, has been to make the vendor members "realize there is a user organization out there," he said. "We may not influence the immediate outcome, but we make people think." □

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# INDUSTRY UPDATE

## AT&T equipment revenue by segment

Revenues	1984	1985	1986	1987
Rentals	\$7,217.3	\$5,788.8	\$4,850.0	\$4,074.0
AT&T Technologies, Inc.	\$5,965.0	\$6,860.0	\$6,723.0	\$6,814.0
AT&T Information Systems	\$4,205.0	\$4,500.0	\$3,800.0	\$4,100.0
Total product sales	\$10,170.0	\$11,360.0	\$10,523.0	\$10,914.0

SOURCE: E.F. HUTTON &amp; CO., NEW YORK

## ► INTERNATIONAL TELECOM

# France attempts to smooth U.S. feathers

BY KARYL SCOTT

Washington, D.C. Correspondent

WASHINGTON, D.C. — French telecommunications officials recently played hosts and peacemakers to U.S. government and industry officials here, in an attempt to improve trade relations in the wake of the French government's decision not to award the sale of a French telecommunications manufacturer to AT&T.

Officials from the French Post, Telegraph and Telephone administration, Direction Generale des Telecommunications (DGT), and from the French telecommunications industry addressed a variety of trade and technology issues at a

seminar sponsored by France Telecom, Inc., the U.S. subsidiary of DGT.

DGT's Director General, Marcel Roulet, told the group that his country's decision to award the sale of the state-owned Cie Generale des Constructions Telephonique to Sweden's LM Ericsson in April was not politically motivated but based only on technical and commercial considerations.

AT&T lost the bid because the technology it would have implemented in France — the 5ESS central office switch — would have required a great deal of alteration to work in the French public network. This would have taken more

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## BRIEFS

**Corvus Systems, Inc.** signed an agreement valued at \$3 million, under which the company will sell workstations and network servers to **Control Data Corp.** for resale to CDC's customers.

William R. McCarthy, formerly vice-president of planning and business development at **Infinet, Inc.**, was appointed to the post of president and chief executive officer of **Tesdata Systems, Inc.** As previously announced, Tesdata has agreed to merge with Infinet.

**British Telecommunications plc** announced an 11.7% increase in pretax earnings for the fiscal year ending March 31, 1987. Earnings in fiscal 1987 were \$3.3 billion. Revenue for the fiscal year was \$15.2 billion, a 12.4% increase over the year earlier.

**US Sprint Communications Co.** recently appointed Earl E. Lawson executive vice-president of finance and MIS and Phillip C. Cooke senior vice-president of human re-

sources. Lawson previously served as vice-president and controller of **GTE Corp.**'s product and systems group. Cooke previously served as vice-president and senior human resources officer at **Citicorp**'s U.S. Card Product Group in New York.

**ComStream Corp.** of San Diego recently appointed Scott Smull vice-president of finance and Aaron Angle vice-president of operations. Smull previously served as corporate controller and finance and administration director at **Integrated Software Systems Corp.** Angle was vice-president of operations in charge of commercial high-volume communications products at **M/A-Com Linkabit, Inc.**

**Ansa Software Co.** and **3Com Corp.** recently announced an agreement to jointly market Ansa's multiuser data base, Paradox 2.0, with 3Com's 3System. In order to introduce Paradox 2.0, the companies will sponsor a 12-city seminar series for corporate users, developers and value-added resellers. □

## Infotron boosts bottom line

Infotron Systems Corp., which in its fourth quarter suffered a round of layoffs and an earnings loss, announced that its Infostream NX series of T-1 multiplexers has generated more revenue and unit shipments than any new product line in the company's history. Since the Infostream introduction in February, 32 unit sales have contributed \$1.5 million in sales, which should provide a welcome boost to Infotron's bottom line.

## ► MANAGEMENT

# User as vendor: A new viewpoint

*Job change changes perspective.*

BY PAM POWERS

Senior Editor

Next time you wonder about vendors and the wide gulf that separates your needs and their products, talk to someone like Norman Gentry, Richard Courtney or John Hart — they've worked on both sides of the business.

After looking at things from the vendor point of view, Gentry and Courtney came back to being users, but with a decidedly different approach to vendors. Hart remains with a vendor, but he hasn't forgotten his user roots.

"Every user wishes he could talk to vendor design engineers to create a product that answers his needs, and believe me, every design engineer wishes he knew what the user wants," said Gentry, communications manager for WSI Corp. in Medford, Mass. Gentry spent more than two years at Codex Corp. as an electrical engineer in group development of network management software.

Although he enjoyed his stint at Codex, Gentry said the position didn't suit him because of the large company bureaucracy and, more

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## INDUSTRY EYE

PAM POWERS

# Value-added network landscape still shifting

**T**he value-added network (VAN) vendors must feel a little beleaguered lately, what with all the unsolicited attention they've received from the Federal Communications Commission.

Things first took a bad turn when deregulation allowed the Bell operating companies to offer protocol conversion as part of their enhanced packet network services.

A second blow was dealt to the VANs, or so they felt, when the FCC more recently decided that enhanced services will continue to be classified as enhanced but need no longer be offered through a separate BOC subsidiary.

The VANs railed against those decisions, perceiving the BOCs as unfair competition. But over time, it has become clear that the BOCs will more likely couple their intra-local access and transport area services with the VANs' inter-LATA services.

That would be mutually beneficial to both parties: The BOCs could offer their users easy access to inter-LATA services, and the VANs would be able to provide better service

within the local loop.

Since only a negligible trickle of annual VAN revenue is contributed by users with intra-LATA data traffic, what they lose to the BOCs won't hurt them, the VAN providers contend.

But the possibility of FCC-imposed access charges recently proposed by the agency for VANs ("FCC plan would make VAN costs skyrocket," NW, June 15) poses a more serious threat.

If some of the calculated per-terminal-hour charges now being bandied about are correct — Telenet Communications Corp. estimates approximately \$4.50 — the vendors and users of public data networks (PDN) are in for a painful surprise.

It's pretty much axiomatic that Tymnet/McDonnell Douglas Network Systems Co. and Telenet will pass these costs on to the information services companies, who will in turn pass them on to users.

From what can be determined about the VANs' financial health in the absence of raw data, they operate with much-less-than-substantial

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## A new viewpoint

continued from page 9

importantly, the work required specialization, while he prefers the more generalized duties associated with a communications manager's job.

The user-vendor-user path taken by Gentry has given him a better understanding of the gulf separating the two camps. He said product designs often do not fit user needs because the engineers don't have direct access to users.

"When I was at Codex, engineers used to beat a path to my door asking what problems I had as a user and how I addressed them," Gentry said. "The engineers read books, but real life in the communications world doesn't fit those textbook accounts."

His vendor experience has proven invaluable, Gentry said, because he now knows who to call at a vendor company to get answers about how products work. He also knows how products will respond if installed in an unusual configuration.

Richard Courtney was the manager of data communications for Transamerica Corp. for four years before joining Racal-Milgo, Inc. in Sunrise, Fla., as product line manager for network management systems.

"Very few people in the vendor community have actually run a network on a day-to-day basis, which is quite different from designing a product on functional specifications based on what the vendor thinks the user wants," Courtney said.

Courtney, who was offered the Racal-Milgo position when he was president of the company's users group, said he empathizes with the vendor's difficulties. "Users have very little idea what an involved, complicated process it is getting a product out the door," he said.

Vendor/user relationships could be vastly improved if vendors hired communications managers for their staffs more often, Courtney suggested. "I can give Racal-Milgo a user's point of view on a daily basis," he said. "That's invaluable for both sides."

Courtney said that, in addition to his user perspective, his managerial skills and knowledge of the Racal-Milgo Communications Management Series (CMS) product line transferred well into his new position as a product line

manager.

John Hart, now director of the telecommunications marketing group at Digital Equipment Corp. in Maynard, Mass., brought a similar set of skills with him to DEC after his seven-year stint as Gould, Inc.'s director of corporate telecommunications.

Hart's migration from the user side to the vendor side was a carefully

planned one, he said, built around a conviction that he would best serve the industry and his career aspirations by knowing both sides of the business.

Hart said his experience at Gould was enjoyable because the company was forward-thinking and believed in using the network as a strategic asset. But his transition to the vendor side has given him "the

luxury of strategic and long-term planning," he said.

"I have gained the skills of a business manager, instead of a firefighter or problem manager," which is what Hart said he feels most users unfortunately are.

Hart said he enjoys being in less of a "react mode," and like Courtney, believes his knowledge of user

needs has aided him in his new role as marketing director. No matter where he ends up, Hart said his experience on both sides of the business is all part of a well-laid career plan that will provide him with a complete range of communications-industry skills.

"I knew from the beginning," he said, "I wanted to see this industry from every angle." □

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## France smooths

continued from page 9

time and financial resources than DGT was willing to invest, Roulet said.

Roulet went on to say he hoped the decision would not harm future trade relations with the U.S. "This was only one matter," he said. "We ask you to withhold judgment. Do not

judge our policy by one decision, but over time."

As the French telecommunications system is deregulated and state-owned telecommunications companies become privatized, there will be increasing opportunities for U.S. companies to participate in the French market, Roulet and other officials said.

While U.S. government and industry representa-

tives at the seminar declined to comment on the record about France's attempts to open its market to U.S. companies, off the record, several U.S. officials said France has done little more than give lip service to competition.

France took the first step toward deregulation of the state-owned telecommunications authority last year when legislation was

passed creating two separate telecommunications entities.

The DGT was designated as the telephone service company and the Commission Nationale de la Communication et des Libertes under the Ministry of Posts and Telecommunications was made responsible for regulatory matters.

"In France, we are evolving toward a separation of

the regulatory role and the operational role. The DGT will not be the arbiter of private sector entry," Roulet said.

Roulet said the DGT will remain the principal supplier of basic telecommunications services, "because this is a social responsibility, and we are not likely to alter this fundamental precept."

The relative size of the French telecommunications market also limits the scope of competition for local and long-distance service, said Marc Danelot, director of the Cabinet of the Ministry of Posts and Telecommunications.

"The DGT is approximately the size of one regional Bell holding company. The extent of competition is thus limited on practical grounds," he said. □

## Landscape shifting

continued from page 9

profit margins.

Constant upgrades to and expansion of the network, coupled with the cost of leased network capacity, make the business a very expensive one. There is simply no way that they can absorb access fees as well.

That means, of course, that the user will bear the brunt of the fees, which may result in a mass exodus from the PDNs. Then Tymnet and Telenet are left with a dwindling revenue stream and a smaller user base among which they must distribute the fixed cost of operating a PDN.

But the FCC contends that future subscriber line charge increases will swiftly diminish the cost of per-hour access for the VANs, as the burden of fees is shifted to the consumer and away from business.

In that case, the \$4.50 per hour Telenet has calculated would look more like \$2 or less, and the size of that charge looks potentially much less disastrous for VAN business.

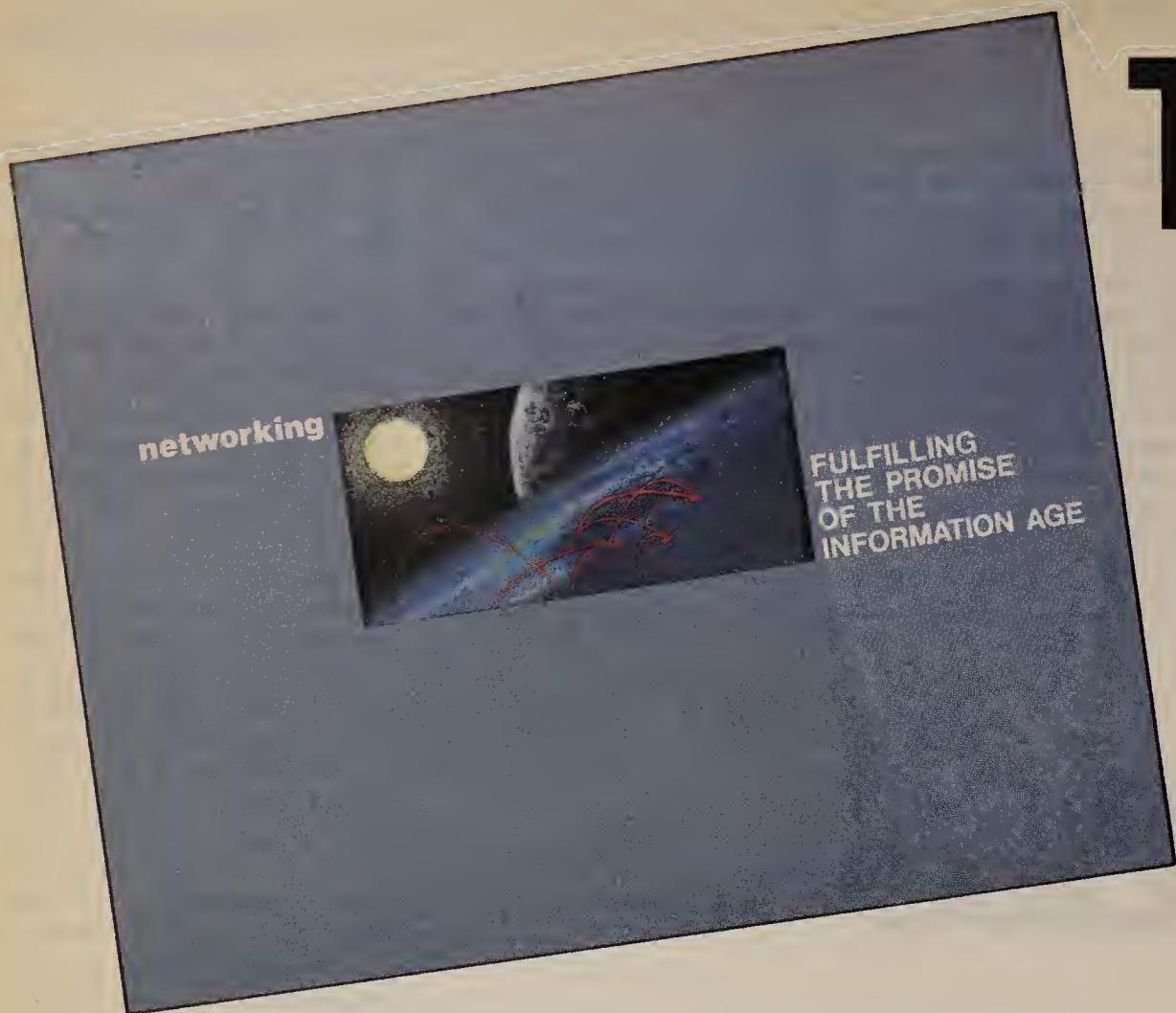
Since it's all still very much up in the air, it is difficult to make accurate predictions about whether the charge will even go through, let alone what impact it will have.

But one has to trust that the FCC is anxious to promote innovation in information services, and if a per-hour usage charge threatens the health of those services, something will probably be done to offset the damage. □

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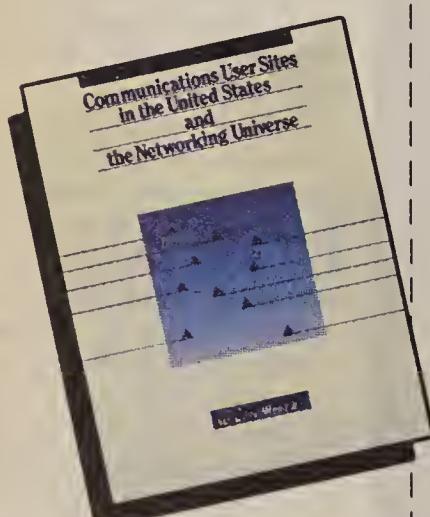
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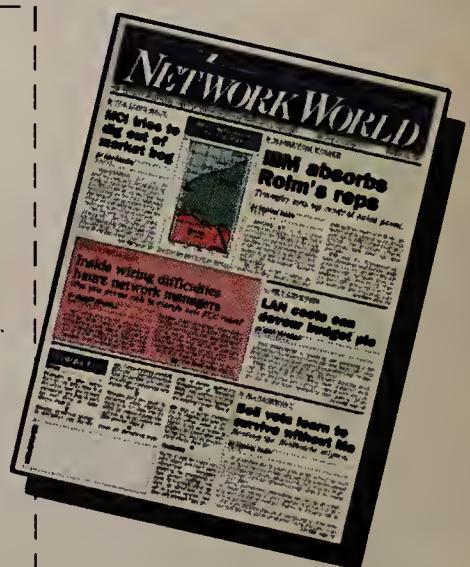
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# TELECOM TRENDS

## TEL Electronics signs with Best Western

TEL Electronics, Inc., a call accounting systems vendor based in American Fork, Utah, recently inked a two-year national account dealer agreement with Best Western International.

Under the arrangement, TEL Electronics will provide the lodging chain with 700 TEL Systems. These systems will be used with BestNet, Best Western's corporate communications network.

### ► SALES PACT

## Firm sells voice mail via Amway

*Amvox signs with Centigram Corp.*

BY BOB WALLACE

Senior Editor

SAN JOSE, Calif. — Amvox Corp. recently penned a three-year sales pact, valued at \$20 million, with voice-messaging systems vendor Centigram Corp. as part of a plan to offer automated telephone answering and voice-messaging services to medium-sized and small users in 35 cities by year's end.

Amvox, a business partner of Amway Corp., is a privately held company that installs and maintains Centigram VoiceMemo voice-messaging systems. Amvox will sell these voice-messaging services through Amway's network of 700,000 distributors. This marketing group rang up sales of Amway home and personal care goods totalling \$1.3 billion in 1986.

The IBM Personal Computer-based Centigram systems, which also incorporate Tellabs, Inc. trunking equipment, will be located in Amway offices close to Bell

operating company central offices with wide geographic coverage.

A caller trying to reach an Amvox voice-messaging office would dial a seven-digit direct inward dialing (DID) telephone number. The call would be routed through the central office switch and over a DID trunk to the Tellabs gear, which converts this trunk line into a two-wire ear and mouthpiece line. This line connects directly to the voice-messaging system.

Amvox said the services will first be made available in New York, Los Angeles/Orange County, Chicago, Dallas/Fort Worth and Miami. Amvox's voice-messaging services will be tailored to meet the needs of small businesses and branch office locations of larger corporations that wish to avoid the cost of purchasing a corporation-wide voice-messaging system.

A Centigram spokesman said this agreement represents the single largest sale in the company's 10-year history. The Centigram-

Amvox deal is Amway's third telecommunications venture. Otto Stolz, Amway's executive vice-president, said the company has sold roughly \$120 million worth of long-distance communications services for MCI Communications Corp. since early 1986. Amway has also sold satellite equipment and programming through Starion Entertainment, a partially owned subsidiary company. Stolz said the firm's next foray will be into the cellular paging business.

Centigram predicted users will pay from \$12 to \$30 monthly for the offering, depending on the number of messages the voice mailbox is set up to handle and whether such features as call forwarding are used. Those with mailboxes on the system could call in and receive messages without operator assistance.

Three flavors of the voice-messaging service will be available. Amvox I can store up to eight messages at a time, each a minute long, for up to six days and carries a suggested retail monthly price of \$12.95. Amvox II can store as many as 16 two-minute messages for up to eight days and may cost \$19.95. Amvox III stores up to 32 two-minute messages for as long as 16 days and carries a recommended price of \$26.95. Amvox II and III feature a capability enabling users to forward messages. □

## TELECOM TIDBITS

Southern Bell Telephone and Telegraph Co. recently announced that AT&T Network Systems Group and Hayes Microcomputer Products, Inc. will use Integrated Services Digital Network services when Southern Bell cuts over its first commercial ISDN in March 1988 at its Dunwoody central office in Atlanta.

AT&T's Network System regional headquarters in North Atlanta will use approximately 400 to 450 2B+D basic rate lines, each providing the equivalent of two B, or bearer channels, for voice or data lines and a separate D signal channel.

Southern Bell will serve the location by installing a 5ESS central office switch module in office space leased from AT&T.

Southern Bell will provide Hayes Microcomputer Products with basic rate ISDN lines at its Norcross, Ga., facilities using T-1 carrier technology to span the distance from the Dunwoody central office.

Hayes will use the service for engineering development, electronic mail, personal computer-to-personal computer file transfer, order entry, voice communications and facsimile transmission.

Digital Sound Corp. of Santa Barbara, Calif., recently announced the signing of an OEM agreement valued at \$1.7 million with Ericsson Information Systems, Inc. of Richardson, Texas.

The agreement calls for Ericsson to market Digital Sound's Voice-Server System, a Unix-based system that is designed for general-purpose voice processing and storage.

The VoiceServer may be utilized for different purposes, including voice mail, voice response or audiotex.

Microvoice Corp. of Irvine, Calif., recently introduced an entry-level automated operator system that answers four calls simultaneously.

The four-port Apex can support up to 100 incoming private branch exchange trunks and provide user option menus to route calls to 512 different department, subdepartment or individual extensions.

The Apex system allows small business users to have 24-hour call processing with special messages at night, during the day or on weekends.

In addition, a microphone allows users to revise and update operator messages on site. The Apex automated operator system costs \$7,995. □

### CROSS TALK

JOHN DIX

## Private nets will survive ISDN

Private networks are often pitted conceptually against Integrated Services Digital Network environments, but they are not mutually exclusive.

Although ISDN presumes customers will come to rely on intelligence within carrier networks, users who prefer private networks will still be able to reap ISDN benefits by using customer premises equipment compatible with the standards.

It is possible, in fact, that private ISDN networks could evolve more quickly than commercially available ISDN carrier services. Hybrid networks — part public ISDN and part private network — could also provide an attractive option for some companies or a good migration path.

In concept, ISDN will enable customers to integrate multiple voice and data channels over the same carrier access trunk, and, once inside the carrier net-

work, fan out these channels and individually route them.

The composite access trunks will include voice and data B, or bearer, channels, which are controlled by a D signaling channel. The so-called out-of-band D signaling channel will enable customer premises equipment to configure the B channels on a call-by-call basis by interacting with carrier-based switches. A channel used to carry voice one minute could be reconfigured the next to carry data to a different location.

However, corporations can build private ISDN networks by using ISDN-compatible customer premises equipment linked with clear-channel T-1 1.54M bit/sec digital transmission facilities, the ISDN equivalent of an Electronic Tandem Network (ETN).

Private ISDN networks rely on the switching, routing and control intelligence of the customer premises equipment and

do not require interaction on an intelligent basis with the public network. A company could, for example, build a network using AT&T System 85 private branch exchanges that support the CCITT primary rate interface, which segments a clear channel T-1 facility into 23 B channels and one D channel. Networking the D channels of multiple T-1 pipes in this environment would provide the equivalent of a carrier-signaling network used to control network links.

Richard L. Snowden, director of the concept development center for AT&T's Business Markets Group, said the evolution of private ISDN networks will not hinder the development of commercial ISDN services. Snowden said AT&T would support private ISDN networks with the same enthusiasm it has given ETN networks. "I think we'll see a number of purely private ISDN nets," he said. □

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# DATA DELIVERY / NET MANAGEMENT

## ► INTERNATIONAL STANDARDS

### Management standard near

*OSI network management framework ahead of schedule.*

BY MARY PETROSKY

West Coast Correspondent

TOKYO — A framework for international network management standards recently moved a step closer to finalization when members of the International Standards Organization (ISO) group that defined the framework recommended it be approved as a draft international standard in a recent meeting here.

According to ISO rules, if the recommendation is accepted by the group's secretariat, the so-called Open

Systems Interconnect Management Framework will move from the draft proposal phase to the draft international standard (DIS) phase. DIS status is one step away from full acceptance of a standard, and this status signifies a standard's stability, according to several participants in the standards process.

The framework is a conceptual model that describes how the interconnection between so-called "open" systems should be managed, including a specification of which net man-

#### Open Systems Interconnect network management standards

OSI management framework	Development plan				
	1986	1987	1988	1989	1990
Common management information services and protocols	Draft proposal			Draft International standard	
				International standard	
Specific management information services and protocols	Configuration management, fault management, security management	Draft proposal	Draft International standard	International standard	
	Performance management, accounting management		Draft proposal	Draft International standard	International standard
Management information base		Draft proposal	Draft International standard	International standard	
Directory services	Draft proposal	Draft International standard	International standard		

SOURCE: HEWLETT-PACKARD CO., PALO ALTO, CALIF.

agement services should be provided and which protocols will be used.

"We have spent seven years defining what has to be accomplished by OSI net management and how,"

said Trudy Reusser, a standards engineer in the Information Networks Group of Hewlett-Packard Co. and founder of the network management committee.

According to Reusser,

the decision to push the network management framework along to DIS status comes about five months ahead of predictions for this step in the

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#### DATA DIALOGUE BY PAUL KORZENIOWSKI

### IBM/NET pact poses puzzles

The recent joint marketing and development agreement reached by IBM and Network Equipment Technologies, Inc. (NET) was seen as a major boost for the Redwood City, Calif., firm, which has rocketed from start-up company to one of the leading names in the communications industry.

The deal gave IBM nonexclusive, worldwide marketing rights for NET's IDNX line of T-1 multiplexers. Both firms refused to reveal the length of the agreement, but at first blush, the agreement looks like a match made in heaven.

IBM benefits because it had a glaring hole in its product line without a T-1 multiplexer. Big Blue customers have been moving to vendors such as NET, Timeplex, Inc. and Digital Communications Associates, Inc. to fill the void.

As part of the agreement, IBM will also be able to add NET communications protocols to existing products and develop new products that closely link the two companies' offerings. IBM may apply this part of the agreement to upgrade its front-end processors. Customers report the IBM 3725 front-end processor does not have enough horsepower to work with a T-1 line and quickly becomes a network bottleneck. IBM and NET should be able to solve that problem. A second development area would be the integration of

the IDNX more closely with Rolm CBX private branch exchanges.

With the agreement, IBM not only gave its stamp of approval to the T-1 multiplexer market but also to the fledgling 3-year-old company. In a competitive market, that approval could mean the difference between survival and starvation. IBM has the marketing might to move a great number of NET's products.

The agreement could have an immediate impact in the international arena. NET has been busily increasing the size of its domestic sales force and has tapped few foreign markets. Ellen Hancock, IBM vice-president and president of the Communication Products Division, said IBM plans to enhance the IDNX so it can better support international T-1 lines and will soon begin selling the IDNX through IBM international sales arms.

Lurking beneath the surface benefits of the agreement are some potential shortcomings that would be felt more sharply by NET than IBM. IBM should move many IDNX multiplexers, but that does not mean NET will reap substantial profits. Big Blue has the marketing muscle to demand large discounts from its OEM suppliers, and this agreement probably isn't any exception. NET quickly gained profitability by maintaining a high margin on

See page 16

#### IBM INSIGHTS

**What's in a name anyway?** IBM has inadvertently created some confusion in naming one of its peer-to-peer networking capabilities. The confusion started when IBM published a document delineating a new communications scheme, dubbed Low Entry Networking (LEN), which enables devices such as a System/36 or a Series/1 to establish peer-to-peer sessions on a Systems Network Architecture network. Previously, SNA was hierarchical, and only a host could establish a session between two devices.

Devices in an SNA network fall into classes of so-called Physical Units, the most common being PU 2.0s. LEN works with IBM PU 2.1 devices, which are more intelligent than PU 2.0 devices. Thus, PU 2.1 has become synonymous with LEN. Clear enough, so far.

PU 2.1 devices can move messages only to a directly connected device. To free devices completely from networking host dependence, IBM added routing tables to certain PU 2.1 nodes, enabling them to route messages through a network. The added routing capability, which was announced only for the System/36, was labeled Advanced Peer-to-Peer Networking (APPN). At this point, things started to become a little murky.

Next, someone at IBM took a look at the PU acronym and decided it was not appropriate for Big Blue products. So, PU 2.1 devices were renamed to SNA Type 2.1 nodes. In conclusion, PU 2.1, LEN and SNA Type 2.1 are basically synonymous, and APPN builds on these capabilities.

Another item of confusion is which pieces of the new networking scheme are open. John Pickens, senior communications architect at Communications Solutions, Inc., a San Jose, Calif., consulting and software firm, noted that IBM has declared PU 2.1 an open architecture and published the specifications vendors need to develop PU 2.1-compatible products. However, the company has not made any statements or delineated any APPN specifications.

An IBM spokesman said the company is examining whether or not to declare APPN an open architecture. IBM appears to be a bit uncertain about how to proceed with APPN. Including true peer-to-peer networking capa-

See Insights page 16

“ By placing PU 2.1 capabilities in its Network Control Program, IBM is reducing the dominance of the host in a Systems Network Architecture network. Total independence from host-based domains may not happen right away, but IBM has begun to make SNA a more attractive offering for truly distributed systems.

Atul K. Kapoor  
Vice-president  
Kaptronix, Inc.  
Haworth, N.J.

## IBM/NET pact poses puzzles

continued from page 15

its products and will likely be hard-pressed to match those margins under any IBM agreement.

Historically, joint marketing agreements have been fraught with difficulties. A few years ago, General DataComm Industries, Inc. signed an OEM agreement with Cohesive Networks, Inc. On paper, the agreement looked as attractive as the NET/IBM deal. However, neither company was ever really satisfied with the agreement, which was terminated when Digital Communications Associates, Inc. purchased Cohesive last year.

One problem with joint marketing deals is that the two participating parties are usually more concerned with their own well-being than with the success of the agreement. Big Blue's interest in the NET deal is illustrated by the fact that the company did not include NET's low-end multiplexers in the joint marketing agreement because

they compete with IBM products. NET's aspirations can be seen in the company's continued commitment to establishing an international sales and distribution arm, rather than granting IBM exclusive sales rights.

Distribution problems could arise under the current arrangement. NET customers are IBM customers, including such companies as American Airlines, Inc. and Wells Fargo & Co. These users may find two sales forces with the same products calling on them, a situation that can be a trifle confusing.

In addition, NET announced in February a joint marketing agreement with Doelz Networks, Inc., which may even lead to a situation where three sales forces are besieging a single user.

Most importantly, NET may have handed over customer account control to IBM. By wooing many of the nation's largest communications users, NET positioned itself for rapid growth in the next few years. These customers obviously will add other items to their

networks. With NET T-1 multiplexers in place, many would have purchased other types of communications equipment from the company.

Last summer, NET purchased ComDesign, Inc. and added low-speed multiplexers to its product line. Bruce Smith, president of NET, said the company was looking to acquire other companies to round out its product line, a strategy hailed by many industry analysts.

It will be interesting to see if that strategy changes. IBM has long seen NET customers as its own and wants to control them. When IDNX customers need additional communications products, will they look to IBM or NET?

An NET spokesman said the company's goal is to let the customer decide which vendor to select. If they opt for Big Blue, NET may have to rethink its long-term strategy and decide if it wants to become a primary source of communications equipment or play second fiddle to IBM. □

## Insights from page 15

bilities in a hierarchical network is a tricky technical achievement. The company has been reticent about APPN and appears to be taking the better-safe-than-sorry approach before making it widely available.

**Let's hear it for more competition.** "Telecom/Eye Bee Em," a newsletter from International Resource Development, Inc. in Norwalk, Conn., reported that Ameritech plans to battle IBM on the communications software front. Last year, Ameritech purchased Applied Data Research, Inc., a Princeton, N.J., software company.

The report stemmed from remarks made earlier this year by Robert Barnett, president of Ameritech Enterprise Group, to a group of users in Amsterdam. Barnett said that, in addition to its data base software, Ameritech plans to offer software that improves local-area network, microcomputer-to-mainframe and departmental system communications. □

## Management standard near

continued from page 15

standards process. Reusser said she knows of no instance where a working group's DIS recommendation was turned down.

The OSI management framework is likely to become a standard in 1988.

How the framework will actually be implemented in products is defined in four additional standards components, all of which are at different stages in the OSI approval process.

"The purpose of the network management standards is to allow any vendor of network equipment to implement the standards and, by virtue of having done that, be able

to be a player in multivendor networking," Reusser said.

Standardization does not automatically mean vendors' products will work together, however. ISO does require that a standards proposal include conformance proposals before it is accepted as an international standard, according to Will Collins, principal engineer for Codex Corp. in Canton, Mass., and chairman of the ANSI XT35.4 committee on OSI management for the past three years. However, implementation of a standard is never specified.

The four components are known as common management information services (CMIS) and common management information protocol (CMIP); specific management information services; management

information base (MIB); and directory services.

CMIS is the vehicle for collecting information from and sending information to network nodes, according to Paul Brusil, group leader for network standards and performance at Mitre Corp. in Bedford, Mass.

CMIS has a set of service primitives for reporting and retrieving information, controlling the setting of parameters and initiating actions. CMIS will allow network managers to solicit network information, such as the value of a parameter, from a transport protocol layer, Brusil said.

And CMIS will provide the ability to transfer certain control commands, such as setting a retransmission timer or initiating a diagnostic test.

CMIS and CMIP are furthest along in the approval process. Both are currently in their second round as draft proposals, and these proposals were approved for balloting by ISO members at the Tokyo meeting, Reusser said. If approved, CMIS and CMIP will move on to the DIS stage, with full standard status likely in 1988.

CMIS and CMIP represent the protocols vendors need in order to implement the network management framework, Collins said.

In the event that the standards group is not able to draft an exhaustive set of services available in CMIS, it has left what Brusil called "placeholders" in the OSI management standards for specific management information services to be developed.

There are five categories of specific management information services, comprising configuration management, fault management, security management, performance management and accounting management.

Due to a lack of participants in the standards-making effort, the specific management information services are farthest from being

standardized, Collins said.

The third component of OSI management is the MIB. MIB "describes all the information that's needed in order to make management decisions," Brusil said.

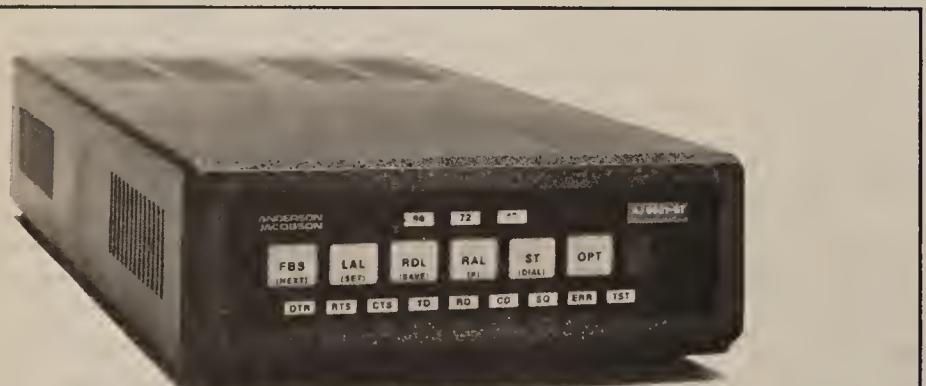
Some of this information resides within protocols and is transient, such as when a protocol layer counts the packets it is sending and the number of connections it has. Other information may be in historical archives of performance and accounting data, Brusil said.

Although ISO does not specify whether the MIB is centralized or decentralized, "in reality, it will be a totally distributed system," Brusil said. The MIB proposed standards are expected to enter the DIS stage sometime next year.

## Directory services

The fourth component of OSI management is directory services. These services are designed to manage naming information and the distribution of name-related information, such as the associations between logical names that network users might employ and actual networking addresses, Brusil said. Protocol layers and the range of network nodes — such as gateways, host computers and terminal servers — all have addresses.

In addition to being an ISO standard, directory services also falls under the purview of the Consultative Committee on International Telephony and Telegraphy, according to Hoyt L. Kesterson II, a consulting staff engineer for Honeywell, Inc., Bull Peripherals Corp., Phoenix Computer Products, Corp. and rapporteur for the directory services work group. As a result of that CCITT involvement, the directory services group is under pressure to produce a standard in time for the CCITT plenary session in 1988. Already in the works as a second draft proposal, directory services could reach the DIS stage by the end of this year, Kesterson said. □



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# LOCAL NETWORKING

## ► LOW-END NETS

# Users tepid on data switch

*Early NetCommander users cite pros and cons of product.*

BY PAULA MUSICH

Senior Editor

Software AG of North America, Inc. and Citicorp, two early users of Digital Products, Inc.'s NetCommander data switch, give the product mixed reviews for meeting their printer and modem-sharing needs.

Both firms chose the Watertown, Mass.-based company's low-cost data switch over other networking alternatives because they needed an inexpensive way to

share costly laser printers. Citicorp also selected NetCommander for its modem-sharing capabilities.

Data switches like NetCommander employ circuit-switching technology to move data over RS-232 or unshielded twisted-pair wire in a point-to-point manner at speeds up to 19.2K bit/sec. Because they cost less and are less sophisticated than other networking methods, they are used most often for simple device sharing and limited file transfer.

NetCommander provides periph-

“I think there are some people who believe TCP/IP is strictly a CAD/CAM, government or university solution. I think TCP/IP provides commercial end users with the capability of connecting a lot of different types of machines. If you've got DG, Prime, DEC, IBM [equipment] and a bunch of personal computers and you want to connect them all together, TCP/IP today is the only thing that will allow that to happen. I think it's a viable commercial alternative.

Michael Pliner

Chairman and chief executive officer  
Sytek, Inc.

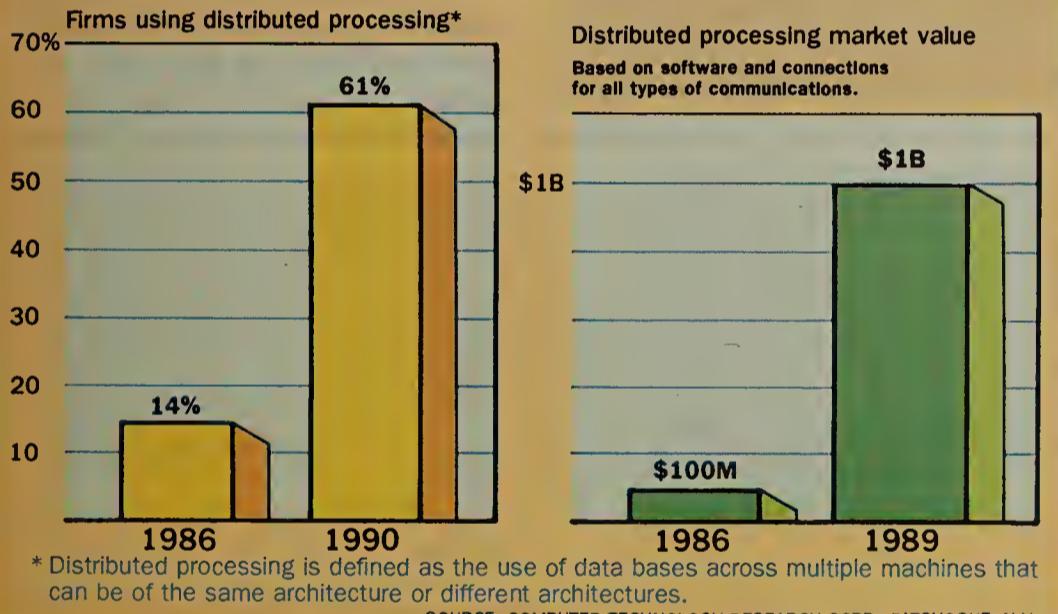
Software AG is using 25 NetCommander units primarily for printer sharing and some file-transfer functions at 22 locations around the country. Seligson estimated that 225 personal computer users are sharing 40 laser printers.

Because Citicorp Industrial Credit's Leveraged Financing Department wanted shared access to a central electronic mail system, modem sharing was an important feature. "Modem sharing was the determining factor for us, although cost did come into play as well," said Al Gersbeck, senior systems officer at the Harrison, N.Y.-based financial services firm.

Citicorp users at nine different locations throughout the U.S. are using 35 NetCommander switches for sharing modems and printers.

See page 18

## Distributed processing in Fortune 500 firms



## NETWORK NOTES

Codenoll Technology Corp. of Yonkers, N.Y., and Standard Microsystems Corp. recently introduced a product that allows Attached Resource Computer Networks (ARCNET) to be implemented on fiber-optic cable at a cost said to be slightly higher than that of copper cable.

Codenet Fiber Optic ARCNET is a single card that plugs into an IBM Personal Computer or compatible and attaches directly to the fiber-optic cable. ARCNET is a baseband, token-passing local network technology that operates at 2.5M bit/sec. The fiber-optic network costs about \$700 per connection.

The Wollongong Group of Palo Alto, Calif., improved the performance of its Digital Equipment Corp.-compatible networking software and added several enhancements, including support for inter-

networking, subnet routing and Exterior Gateway Protocols for 12 different physical interfaces.

Release 3.0, which works on all DEC/VMS processors, adds support for primary and secondary domain name servers and an improved WIN/TCP mail system. The system supports distribution lists, use of nicknames and domain addressing.

Server Technology, Inc. of Sunnyvale, Calif., recently acquired data switch vendor Crosspoint Systems of Eugene, Ore. No value was placed on the acquisition.

Server Technology will bundle the Crosspoint line of data switches with its Easyprint software for a new family of products that allow IBM Personal Computers and compatibles or Personal System/2-class machines to share peripherals. Crosspoint will be a division of Server Technology. □

## LANMARKS

ERIC KILLORIN

# The Dark Ages vs. plug-and-play

The communications industry is progressive in many ways, but it's in the Dark Ages when it comes to standards.

If the home audio equipment market were like the local-area networking business, music lovers wouldn't be able to attach components from different manufacturers to achieve the sound they wanted. The electrical service supplied by utility companies would vary from house to house, making the plug-and-play world we enjoy today an impossibility. And imagine a favorite radio station operating at a different frequency with each radio manufacturer's equipment.

This nightmarish scenario is the reality of local network planners throughout the user community; their attempt to attach computers from different vendors is often solved with bulky protocol converters, costly gateways, the overhead of host intervention and endless lines of code needed to convert dissimilar file structures.

What's to be done? While there are several standards organizations working to achieve systems interoperability, the

Killorin is the publisher of "Netline," an industry newsletter on computer networks, a publication of Hyatt Research Corp. in Andover, Mass.

Corporation for Open Systems (COS) has become one of the most visible. COS' objective is to accelerate the adoption of Open Systems Interconnect (OSI)-compliant protocols. Although many have given COS only lip service — just as with the International Standards Organization itself — COS is gaining momentum on the strength of more than 60 members.

These members have generated funding for testing and certification and have developed an aggressive campaign to show that ignorance of OSI isn't bliss. COS is an independent organization, and therein lies the strength of its checks and balances system; neither user nor vendor objectives are unduly catered to.

COS has worked with all seven layers of OSI and has established "platforms" on which various protocol specifications are grouped. There are low-priority and high-priority protocol suites within these platforms, and priorities are based on which protocols can solve the most problems and have the greatest support.

There are numerous specifications being considered for adoption in each layer, which in combination result in a protocol "stack." A protocol stack

See page 18

## The Dark Ages vs. plug-and-play

continued from page 17

is a selection of interoperable layer specifications that provide end-to-end connectivity across the OSI model's spectrum.

A fully functioning layered architecture should have enough independence in the protocol stack to ensure compatibility with other architectures that use alternative interfaces. This is how multivendor communications will be achieved, since each vendor will adopt the protocol stacks most appropriate for its customers.

An interesting development in the upper layers of the platform concerns the Message Handling

System (MHS) protocols. MHS has widespread acceptance in Europe and is receiving attention here. It is a store-and-forward protocol for local network environments, allowing several interconnected computer systems to transfer messages among their users. The series of X.400 electronic mail specifications from the Consultative Committee on International Telephony and Telegraphy have been recommended for adoption as MHS-compliant protocols.

In promoting this electronic messaging standard, COS is faced with the momentum of the large installed base of non-OSI systems such as IBM's Systems Network Architecture and Digital Equipment Corp.'s Digital Network Ar-

chitecture (although DEC is moving much more rapidly away from DNA toward OSI compliance).

Other obstacles for COS are the inherent complexities of developing standards at each layer and the three- to five-year time frame associated with such a task. New local network schemes are also hitting the market regularly, and COS must be able to react.

Even after standards are established, the vendors' implementations must be policed to ensure compliance. In this vein, COS' work is not unlike the work that must be done in the U.S./Soviet talks for regulated nuclear arms; the two sides must obtain not only agreement but accountability and enforcement as well. □

## Users tepid on data switch

continued from page 17

Each location, equipped with a 16-port NetCommander, supports 12 personal computers, two printers and two modems.

Although printer sharing worked fine for both firms, modem sharing for the users at the Citicorp subsidiary fell flat. "Modem sharing is a problem," said Gersbeck. "It's very inconsistent. Sometimes the NetCommanders work; sometimes they don't. We haven't had any problems at our Cleveland office, but we've had all kinds of problems in L.A., and we haven't been able to figure out why."

The department has had to replace 15 of the switches to date. Because the switches failed under warranty, however, the replacements haven't cost Citicorp money — only time and a few headaches, according to Gersbeck.

The switches that had to be replaced would suddenly lose their configuration information for no apparent reason, Gersbeck said. "We'd reconfigure the switches, and two days later, the same problem would reoccur," he said. Configuration information is downloaded from attached personal

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Although printer sharing worked fine for both firms, modem sharing for the users at the Citicorp subsidiary fell flat. "Modem sharing is a problem," said Gersbeck. "It's very inconsistent. Sometimes the NetCommanders work; sometimes they don't. We can't figure out why."

computers into buffers in the switch.

Gersbeck also said that, occasionally, some of the switches would fail to disconnect a completed session, locking out access to a shared modem and ringing up access charges for the Telenet Communications Corp. network Citicorp uses for transmitting data.

Software AG has met with success using the switches for its applications, although the mainframe software vendor doesn't use the switches for communicating between its offices. "We already had a mainframe network with its own electronic mail program," said Seligson. "PCs were already connected to the mainframe."

Citicorp plans to install a new Micom Systems, Inc. switch that will perform the communications functions provided by the NetCommander.

Citicorp will continue to use its existing NetCommanders for printer sharing, but it won't buy any additional switches for that function.

Gersbeck said the combination of decreasing prices for laser printers and the cabling costs associated with installing the data switch have wiped out the cost advantage, making it more cost-effective to buy a printer for each user. □

# COMMUNICATIONS MANAGER

The three information management functions — office automation, data processing and telecommunications — are being merged, with functional responsibility generally under the head of MIS. However, use of the title chief information officer is increasing.

**Excerpt from a survey of 130 major U.S. companies**  
Arthur D. Little, Inc.  
Cambridge, Mass.

## ► INTERVIEW

### GSA's Kreklow on management role

*Managers evolving to executive level.*

BY MICHAEL FAHEY

Senior Writer

SEATTLE — In his 30 years working in telecommunications, Rebel Kreklow has seen the role of the communications manager evolve from tool-carrying technician to executive-level administrator.

"The image of the communications manager is changing. We are being recognized as business managers," said Kreklow, who is chief of telecommunications for the U.S. General Services Administration's four-state Pacific Zone North.

But communications managers have to improve upper management's perception of their role fur-

ther, Kreklow said. "We have to be better trained in terms of financial management, decision-making and personnel issues."

Kreklow and his 25-person staff provide telecommunications services for nearly all of the federal agencies in Alaska, Washington, Idaho and Oregon. They are responsible for 28 telephone systems serving some 1,600 federal offices throughout the four-state area.

Kreklow said communications managers must be better informed about their organization's business goals. "In order to serve our companies and agencies better, we must understand the organization's purpose and how it functions," he said. "It is incumbent on



Rebel Kreklow

the communications manager to show upper management what can be done with communications to further the goals of the organization. But we can't do this without being familiar with its structure and purpose."

To accomplish this, Kreklow meets regularly with the administrators and users from the federal

See page 21

## GUIDELINES

JIM MORGAN

### Debugging systems' people problems

Too often, people attribute communications system failures to technical failures, when they are actually the result of people problems.

Problems incurred at the cut-over of a new telecommunications system, for example, may be blamed on faulty programming or intermittent hardware failures. But the real cause of the problem may be due to cutting corners on user and maintenance staff training; that is, people problems.

In another example, a private branch exchange or local network that experiences excessive downtime due to component failure may be out of service longer than necessary because the telecommunications staff was never taught how to swap out failed components. Or the problem might stem from a lack of spare parts due to management penny-pinching. Or the vendor's maintenance staff might have arrived with the wrong test equipment. All these are people problems.

*Morgan is head of J.H. Morgan Consultants, a Morristown, N.J., company that provides telecommunications management and technical consulting.*

This phenomenon exists because it is often easier to blame equipment for communications problems than to blame people. Upper management is more receptive to equipment problems than to people problems. But the problems will continue until com-

Problems incurred at the cut-over of a new telecommunications system, for example, may be blamed on faulty programming or hardware failures. But the real cause may be due to cutting corners on user and maintenance staff training; that is, people problems.

petent managers see a pattern and identify the real problems.

Technically competent people unfortunately tend to look for technical solutions to problems because that is their area of expertise. They force-fit solutions using the technical knowledge with which they are comfortable. Too many wear technical blinders.

In today's fast-changing com-

munications environment, we must take a broad-based problem-solving approach, considering both people and technology as potential culprits when breakdowns happen. Of course, true technical problems do occur. Components fail; design limits are exceeded; intermittent faults happen; software bugs occur, and weak designs are produced. Telecom people must indeed maintain their technical expertise. But their efficiency suffers when they constantly resort to a narrow technical approach to solving problems.

How can communications managers expand their troubleshooting to include people-related problems? Where will they get the time for understanding their users? The answer is that they have more time to solve the truly technical problems once they recognize the people problems.

In order to sensitize themselves to the issues that lead to human rather than technical problems, communications managers must make an up-front time investment. The effort is worth it. The payoff in correctly diagnosing people problems comes in increased time to devote to true technical problems. □

## ► MEMBERSHIP DRIVE

### COS signs DOD group and Nynex

*DCA, BOC become senior members.*

BY KARYL SCOTT

Washington, D.C. Correspondent

MCLEAN, Va. — The Corporation for Open Systems (COS) said last week the Defense Communications Agency (DCA) and Nynex Corp. have joined COS as senior research members, making them the first federal agency and Bell operating company, respectively, to sign on with the communications consortium.

Adding one of the largest government users and a major communications carrier to the senior ranks of COS is a coup for the 1-year-old standards-testing organization and represents the fruition of months of negotiations.

COS is a nonprofit research and development consortium comprising 67 communications users and vendors. COS' mission is to identify, implement and test Open Systems Interconnect (OSI) protocol standards and drive the development of OSI-based products.

The Office of Management and Budget (OMB), which is responsible for the development of a governmentwide OSI implementation policy, last week endorsed DCA membership in COS. According to OMB, DCA will represent all users within the defense community at COS.

OMB also directed the National Bureau of Standards (NBS) of the Department of Commerce last week to join COS on behalf of all civilian agencies. NBS has not as yet joined.

As senior members, both DCA and Nynex will pay an annual membership fee of \$200,000. Senior membership status gives members the greatest participation in various COS activities and the greatest influence over policy development.

As senior members, DCA and Nynex will be allowed to have representatives on five technical subcommittees, participate in the Strategy Forum — the policy setting arm of COS — and have direct input to the board of directors, said Ted Manakas, COS information products manager in charge of recruitment.

Senior membership status is the See page 21

## DIALOGUE

Have the product announcements IBM has made in the last year made its communications strategy any clearer?

"I don't think they have clarified IBM's strategy very much. It seems that half of their products aren't available, and the ones that are available aren't necessarily fully developed.

I just hope they have a clear picture of what they are going to do. I do suppose it's a little clearer than it was in the past, but it seems they have so many things out there now, it's difficult to make a proper choice. We're an IBM shop, so there's hope that we could utilize some of the products, but it is difficult to decide which ones.

**Robin Fromm**

Communications specialist  
Detroit Ball Bearing Co. of Michigan  
Detroit

"I think the product announcements they've come out with in the past three or four weeks have sounded very good, and they're definitely making the competition and users think twice about buying the equipment. We just went ahead and bought a lot of DEC equipment, but people I've talked with say that down the road they will move back to IBM equipment.

**John Winn**

Communications analyst  
Electronic Data Systems Corp.  
Southfield, Mich.

"IBM's strategy is far from clearer. It's muddled, especially when it comes to SNA, which used to be a very well-defined host-to-peer network. Now you have host-to-peer and peer-to-peer; it's not clearly defined. The equipment announcements are benign, in my opinion, because other manufacturers have already been there.

There isn't really anything innovative or new. There has been some integration of IBM and non-IBM equipment. However, in that integration, they are also forcing you to use the newer technology.

**Walter Southwell**

Telecom analyst/hardware specialist  
Farm Credit Banks  
Irmo, S.C.

"Our company was very pleased to receive the announcements, especially the ones on NetView and Rolmbridge. From the input I've gotten from other people in communications at Fidelity, they are very excited and they are passing along all the information to the various departments because they know it's going to have an impact on us.

**Carmelo Pagan**

Communications analyst  
Fidelity Investments  
New York

— SNA becoming available to others — but we're wondering about LU 6.2; that's still unclear.

**Mike Espenshade**

Senior telecommunications analyst  
Hershey Chocolate Co.  
Hershey, Pa.

"As far as networking is concerned, I haven't seen anything earth-shattering yet. The products are not out, and they are all promises so far.

**Aaron Greenberg**

Telecommunications  
project manager  
Information Systems and Networks, Inc.  
Bethesda, Md.

"I don't think it's made their strategy any clearer. It is still muddled. I think they are, indeed, trying to conform more to what the rest of the industry is doing, but their particular position at this point is not as clear as it could be. I believe they are headed toward more connectivity with other vendors. But, I'm not sure how they are going to do that.

**Richard Lilly**

Data communications manager  
Interstate Electronics Corp.  
Anaheim, Calif.

"I think it made it clear that IBM is putting a lot more emphasis on communications. They announce products and then don't make them available until Novem-

ber. I'm always skeptical about their announcements, because it seems they preannounce things. They announce [Systems Application Architecture] and it's not going to be available for months and months and then a year.

**Jerry Moloney**

Senior communications analyst  
John Hancock Mutual Life Insurance Co.  
Boston

"I go back a long way with IBM, and I am not skeptical. They are pretty reliable. Until they make a total commitment to SNA, I'm not sure where they're going to go.

**David Gray**

Data communications specialist  
International Revenue Service  
Detroit

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"There wasn't anything super-impressive. We weren't impressed with any strategic direction changes, but I think it has a lot to do with what was interesting to us also. We're excited to see IBM relaxing their proprietary standards

## GSA's Kreklow on management

continued from page 19

agencies for whom his department provides telecommunications services.

"We have periodic visits with the agency heads and their telecommunications coordinators," he said. "We have users groups in Anchorage, Boise, Portland, Seattle and Spokane, and we meet with them quarterly."

Kreklow said that although he works for the federal government, he is confronted with the same constraints and opportunities as his colleagues working in the private sector.

The rapid changes in communica-

cations technology and the uncertainties wrought by divestiture have complicated the duties of all communications managers, said Kreklow, who began his career with the federal government as a teletype operator.

"There are more options, and the decisions are becoming more difficult. Things like the cost of money and depreciation schedules are becoming as important as technical issues," he said.

Furthermore, Kreklow said, as communications managers take a more active role in their organizations' overall management, writing and public speaking skills become essential.

"Sometimes the so-called expert is just the person with the best

slide presentation," Kreklow said.

Because the role of the communications manager is changing, Kreklow said, people entering the profession are likely to be products of college- and graduate-level communications management programs. "We are starting to see people with degrees," he said. "Two of my area managers have associate's degrees in telecommunications, and I think it has helped them in their work."

Kreklow, whose first experience with communications came when he enlisted in the Air Force following high school, has taken many courses at local colleges and universities, and he is hoping to earn a bachelor's degree in telecommunications. □

## COS signs DOD group and Nynex

continued from page 19

highest level of participation in COS.

DCA participation in COS' OSI testing work is especially crucial in light of COS' recent drive to attract more user members. The addition of DCA brings the number of users in COS to 18.

"Users are a priority group for COS due to their valuable practical input to our mission," said COS President Lincoln Faurer. "Their experience enhances the research we conduct and adds the perspective of market viability," Faurer said.

DCA officials declined to comment on their specific reasons for joining COS. However, DCA spokesman Major H.R. Hock did say, "DCA hopes to work closely with vendors and other users on the adoption and implementation of OSI and other communications standards."

One of DCA's top priorities is expected to be the implementation of OSI network security standards. "We expect DCA to contribute their expertise in this area and drive the development of security standards that will benefit government as well as private sector users," Manakas said.

Nynex's decision to join COS was approved by its board of directors last week, signaling what could be a trend of RBHC participation in the communications consortium.

Officials at COS have been trying to enlist RBHC membership for some time.

"We felt the time was right to join," said Nynex spokesman Joseph Gagan. "It's an important organization that will be influential in the development of key computer and communications standards in the years to come," he said.

Bell Atlantic Corp. officials, who recently attended a COS strategy forum, agreed with Nynex's sentiments, but decided not to join COS at this time.

"We strongly support the work of COS and feel it is very close to what we are doing in the open systems arena, but we don't have the financial or human resources to commit to COS," said Roger Nucho, district manager for standards and technical requirements at Bell Atlantic.

Nucho did not rule out the possibility of joining COS at some later date. Another major user considering membership is American Express Co., which is weighing the cost/benefit question. "We're very interested in technology such as OSI that will help us move into the future and help us sell our products," said Eileen Bell, manager of International Transaction Services. "We just have to decide whether we can afford the \$25,000 user membership fee."

The DCA's \$200,000 senior membership gives the agency a greater degree of participation and control over policy than the membership type that American is considering. □

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“...I’m looking for vendors who take a systems approach to networking.

And I find them in *Network World...*”

Robert Stark is Manager of Network Operations for Litton Industries of Beverly Hills, California. He supervises the company's voice network analysts as well as those analysts who provide telecommunications consulting services to Litton divisions.

In this position, he is also charged with establishing specifications and making recommendations for the purchase of network communications equipment. And in order to carry out these responsibilities, Robert turns to *Network World*.

“Reading *Network World* definitely helps me in my job. I get crucial information about the viability of certain vendors, which lets me know if I should enter a business relationship with long-term expectations. In my job I’m looking for vendors who take a systems approach to networking. And I find them in *Network World*, which covers networking from a systems point of view.

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# NEW PRODUCTS AND SERVICES

## ► NATIONAL COMPUTER CONFERENCE

### DSC, GTE gear debuts at NCC

*Product unveilings brighten slow show.*

BY JOSH GONZE

Staff Writer

CHICAGO — A few networking gems announced at the National Computer Conference (NCC) here recently helped brighten the pall cast by poor attendance at this year's downsized edition of the once-towering computer show.

Two subsidiaries of central-office switch maker DSC Communications Corp. announced products the company hopes will help it advance into the private network market. DSC Nestar Systems, Inc., the company's local net subsidiary, unveiled a set of token-ring and ARCnet products at a press conference. Concurrently, Granger Associates, Inc., a subsidiary that makes telecommunications gear, announced an enhanced T-1 multiplexer called the CP2000 Digital Network Access System.

The Nestar local-area network

products include three new servers, an intelligent network interface card (INIC) with a built-in coprocessor and an X.25 gateway that lets up to 32 workstations concurrently access public data networks.

Two of the new file servers, the Planstar Models 1 and 2, will eventually replace Nestar's older desktop file server, Plan 3000. The Model 1, priced at \$6,700, offers an 80M-byte disk drive and a 60M-byte tape drive, while the Model 2, which costs \$9,600, offers 150M bytes of each. Both will be available in September. Nestar continues to offer a high-capacity file server called the Plan 5000.

A new asynchronous communications server, the Planstar ACS, is compatible with ARCnet and IBM Token-Ring networks, manages up to 16 modems and handles speeds up to 19.2K bit/sec. It is available immediately in eight- or 16-port

versions. The eight-port version is priced at \$6,000.

The INIC network interface board is IBM Token-Ring Network-compatible and enables IBM Personal Computer XT and ATs to access a Nestar file server. The onboard coprocessor frees the computer's power for other uses and speeds up processing. It is priced at \$595 and will be available in September.

Enhancements to the Granger CP2000 Digital Network Access System multiplexer included increasing the number of T-1 interfaces from six to 20 and the number of DS0 channels from 72 to 240. The expansion was made possible by increasing the number of option card slots from eight to 12 and adding a slave shelf with room for 16 more option cards. Granger also made common equipment redundant to make the whole box largely fault-tolerant, according to division manager Donald Skipwith. Common equipment includes the power supply, system processors and cross-control matrices.

In one of the few other communications announcements, GTE Spacenet Corp. debuted a network management system and a point-to-point data service designed to strengthen its Skystar family of very small aperture terminal satellite communications services.

Skystar's new net management system is based on gear GTE Spacenet calls universal protocol cards, which monitor individual communications circuits and allow reconfiguration of remote terminal equipment. The cards support asynchronous and synchronous protocols and a variety of interfaces approved by the Electronic Industries Association and the Consultative Committee on International Telephony and Telegraphy. Configuration control takes place at the user's site and allows permanent, switched or application-assigned routing for optimization of transmission paths, according to the company.

The McLean, Va.-based company previously offered a more limited monitor and control capability with the Skystar service.

The new system does report-generation, providing data on performance of stations, lines and protocol cards. Statistics are arranged hourly, daily and monthly. An audit file of all network events is stored. The system is Unix-based and, according to GTE Spacenet, can interface with Unix-based local-area networks.

The new point-to-point service, which costs \$1,700 per month, uses the same Ku-band frequencies and provides the same 56K bit/sec transmission speed as the company's multipoint service. □

See inside for:

- OAZ PC-to-facsimile add-on board
- Fox twisted-pair LAN
- PCC's PROFSlink package

## ► PC EMULATION

### Quicklink networks ASCII CRTs

BY JIM BROWN

New Products Editor

COSTA MESA, Calif. — The Network Link recently introduced an IBM Personal Computer-compatible board that enables a connected ASCII terminal to act like a network-connected personal computer.

QuickLink plugs into the host personal computer's expansion slot and supports an ASCII terminal over twisted-pair wire, RS-232 or RS-422 cable. The terminal can then be used with a personal computer keyboard to run MS-DOS applications. QuickLink is based on an Intel Corp. 8086-compatible NEC V-40 microprocessor with 640K bytes of random-access memory.

With a personal computer expansion chassis and an additional 16M bytes of cache memory, the host personal computer can support up to 51 QuickLink boards. In effect, the product allows companies to turn their existing ASCII terminals into local network-connected diskless personal computers.

Each QuickLink board also provides two personal computer communications ports that support attachment from the terminal to a printer and a modem. The firm claims several host personal computers can be linked to expand the QuickLink network capacity beyond 51 devices.

In addition to hosting the QuickLink boards, the host personal computer can be made into a file server by running Novell, Inc.'s Netware/86 or Netware/286 local network operating system. That software allows the connected terminals to share data, resources and applications and exchange electronic mail.

The firm claims the QuickLink product will support interface cards that provide a gateway to other local nets. It also reportedly supports most other communications server offerings, including mainframe gateway products.

Each QuickLink board is priced at \$1,095. The boards are manufactured for The Network Link by InterContinental Micro Systems Corp. of Anaheim, Calif.

The Network Link is located at 3303 Harbor Blvd., Building H-10, Costa Mesa, Calif. 92626, or call (714) 549-9380. □

## ► VOICE MESSAGING

### Voice response units debut at Audiotex

BY JIM BROWN

New Products Editor

NEW YORK — A pair of telephone voice response systems and software that assists users in developing voice response applications were introduced at the recent Audiotex Industry Conference and Exhibition here.

Dallas-based Teknekron Infoswitch Corp. and Los Gatos, Calif.-based Vynet Corp. both released new voice response systems at the show. The systems are designed to guide callers through voice applications and to collect and retrieve data. Any information collected can be stored as voice messages, or it can be passed on to computer data bases.

VMX, Inc. of Dallas and Digital Sound Corp. of Santa Barbara, Calif., also used the show to release software that supports development of customized menu options that guide callers

through voice applications.

Voice response systems answer incoming calls with prerecorded voice messages that prompt callers to enter spoken commands or key in commands using their push-button telephones to enter or retrieve data from a computer. Primary applications include retrieving bank account balances, transferring funds between bank accounts, validating credit cards, entering purchase orders and obtaining airline flight information.

Teknekron Infoswitch's Voice Response Unit (VRU) supports up to 32 voice channels. In addition to recognizing digits entered from a key pad, the Intel Corp. 80286 microprocessor-based product will recognize the spoken digits zero through nine as well as the words yes and no. The VRU will provide a link between voice applications and a host computer data base by

See page 24

## First Look

### Board serves as facsimile, modem, scanner interface

**OAZ Communications, Inc.** introduced an IBM Personal Computer add-on board that provides personal computer-to-facsimile transmission, an integral modem and a document scanner interface.

The Xafax board uses an Intel Corp. 80188 microprocessor with 512K bytes of random-access memory, and it can plug into a personal computer connected to a Winchester hard disk and a floppy disk drive.

The board is also outfitted with a 9.6K bit/sec facsimile modem, a Hayes Microcomputer Products, Inc.-compatible 1,200 bit/sec modem and a small computer system interface that will support connection of an image scanner to the personal computer.

Running in the background while other DOS applications are being executed, the Xafax board features its own multitasking operating system. It will simultaneously retrieve an image from a disk, send a facsimile document and pass a message to the personal computer's host processor for display. The board also performs all the compression and decompression of both image and data as well as several communications functions.

The Xafax board will automatically receive incoming messages and facsimile documents and flash an alert on the user's screen. The message or facsimile document is buffered in the coprocessor's memory and will automatically be com-

pressed and stored as a disk file if the user does not respond after a specified time. The board's RAM typically holds eight pages.

The Xafax board costs \$1,159. **OAZ Communications, Inc.**, 15032 C Redhill Ave., Tustin, Calif. 92680, or call (714) 259-0909.

### Enhanced version of twisted-pair local net

**Fox Research, Inc.** released an enhanced version of its twisted-pair wired local-area network and a repeater that enables users to connect the firm's bus and star network topologies together.

The firm's 10-Net Version 4.0 adds support for the server message block protocols used in Microsoft Corp.'s MS-Net local-area network software and provides interfaces to IBM's Network Basic I/O System. The new version also adds windowing support for the package's Chat and Systems Monitor features. It retains support for such 10-Net features as menu-driven security, network management tools, news, calendar, print spooling and remote job submission.

The 10-Net repeater is designed to link a bus-configured 10-Net local net with a star-configured 10-Net local net in order to extend the overall distance of a 10-Net to beyond 2,000 ft. The unit also features an optional add-on interface for connecting to a fiber-optic cabled 10-Net local net.

Bundled with the firm's 10-Net StarLAN board, the 10-Net Version 4.0 will be available in September for \$695 per connection. The as yet unpriced 10-Net repeater is scheduled for shipment in September.

*Fox Research, Inc., 7016 Corpo-*

rate Way, Dayton, Ohio 45459, or call (513) 433-2238.

### Package links cc:Mail to IBM's PROFS

**PCC Systems, Inc.** released a gateway that allows users of its local-area network-based electronic mail package to exchange E-mail messages and files with users of IBM's mainframe-based Professional Office System (PROFS).

PCC Systems' cc:Mail PROFS-link runs in conjunction with the firm's cc:Mail LAN and cc:Mail Gateway Version 1.4 packages. It can be configured to provide an automatic connection between any local net and an IBM mainframe running PROFS. In order to link cc:Mail Gateway to the mainframe, the user must provide a Hayes Microcomputer Products, Inc.-compatible 2,400 bit/sec modem.

Users of personal computers attached to a local net would address an E-mail message and attached DOS file destined for a PROFS user as if the message were to be delivered to another cc:Mail user. PROFS-link automatically converts the cc:Mail message to a PROFS note, and the DOS file is spooled to the recipient's PROFS reader file. It then connects to PROFS, delivers the message and picks up any messages waiting to be delivered to cc:Mail users. cc:Mail PROFS-link will also convert PROFS messages and IBM's Conversational Monitor System files for delivery to cc:Mail users.

Available in August, PROFS-link costs \$995.

**PCC Systems, Inc.**, Suite 201, 480 California Ave., Palo Alto, Calif. 94306, or call (415) 321-0430.

### Mainframe-based telecommunications

The **Cincinnati Bell Information Systems, Inc.**'s Communications Management Systems Division recently announced a modular, mainframe-based software system designed to manage private telecommunications networks.

The Communications Management System (CMS) offers nine software modules that can be used separately or together. A master module provides security and coordinates interactions between modules. Other modules support such functions as call accounting and traffic analysis, equipment inventory, work- and service-order tracking, cable records management, on-line call record inquiry, trouble reporting, on-line directory and a message center.

The package will work on IBM mainframes as a CICS application under MVS. The system will support IBM's 3270 data stream and 3270-type interactive terminals. According to the firm, the software system will support as many call records, telephone stations, inventory items and nodes in a network as can be supported on the mainframe. However, in order to be cost-effective, this system should be used to manage telecommunications networks with more than 200 extensions, and it is being aimed at firms that support about 1,000 extensions.

The cost of CMS software modules ranges from \$10,000 to \$65,000 per module. CMS's entire line will be available in 1988.

**Communications Management Systems Division, Cincinnati Bell Information Systems, Inc.**, 1500 Planning Research Drive, McLean, Va. 22102; call (703) 556-2300.

## Voice response units debut

continued from page 23

making the voice response system appear to an IBM host as either an IBM 3270 or 5250 terminal.

Data collected as telephone key pad digits or spoken commands is presented to a host computer, which will retrieve needed data and pass it back to the VRU. The VRU will convert the data to speech and read it to the caller. According to the firm, the device will support IBM's Binary Synchronous Communications or Synchronous Data Link Control protocols as well as Burroughs Corp.'s Poll>Select, NCR Corp.'s Polled Terminal Emulation and TTY protocols.

The new product has a menu-driven application development language and is reportedly compatible with all private branch exchanges, Centrex services and trunk types. It can also work with the firm's ACD86 automatic call distributor.

Featuring two hours of voice storage, the firm's VRU is housed in an IBM Personal Computer-like cabinet and priced between \$37,000 and \$85,000. That price also includes a display monitor, keyboard and hard disk.

Vynet Corp. used the show to introduce an IBM Personal Computer AT-based voice response system and application development software. The V4000 system supports as many as 48 voice channels and up to 60 hours of voice storage.

The V4000 system uses Vynet's proprietary VOS4000 Voice Operating System. That software supports menu-driven utilities that allow users to write, digitize and edit

Data collected as telephone key pad digits or spoken commands is presented to a host computer, which will retrieve needed data and pass it back to the VRU. The VRU will convert the data to speech and read it to the caller.

voice applications. It will also support its own data base for stand-alone applications. In addition, the software will interface to other local or remote computer system data bases over standard RS-232- or IBM 3270-type communications links supporting IBM's SDLC.

Vynet's system also allows callers to enter key pad digits in response to voice prompts, access computer data or leave a voice message. Vynet's new offering works with a PBX and automatic call distributors.

Supplied with a keyboard, display monitor, a 60M-byte streaming tape drive and choice of hard disk drives that support between 12 and 60 hours of digitized voice storage, the V4000 is priced in the range of \$75,000.

Vynet also introduced the \$2,500 Voice Application Software Tool (VAST) that allows users to develop voice response applications. Layered on top of Vynet's

Voice Operating System, the package can be used with Vynet's VASTCOM and VAST3270 software to support RS-232- or 3270-type connections between the V4000 and a host computer.

VMX released InfoLink, software designed to allow its Voice Messaging Exchange to give callers a list of up to nine options that will route them to other applications, including data entry and data retrieval. With the \$3,000 InfoLink, a caller will hear a prerecorded greeting followed by a list of up to

nine options, any of which can be chosen by pushing a key pad digit. The caller can be presented with up to 12 lists of nine options each.

For example, InfoLink can be used to relay interest rate information on a variety of loan offerings or savings plans. A caller would be asked to enter a 1 to get loan interest rate quotes or a 2 to get savings plan interest rate quotes.

A list of up to nine different loan or savings options can then be listed. The caller could retrieve information on any of them by pressing the corresponding key pad digit. Another list of up to nine options could then be presented to the caller, including the option to transfer out of InfoLink to an operator or to a voice mailbox.

Digital Sound's VoiceForms software is designed to allow the firm's VoiceServer System to support survey- or questionnaire-type applications. During a VoiceForms application, a caller would enter key pad numbers or spoken answers in response to prerecorded questions. That data would be collected and stored on disk until it can be transcribed.

Up to 50 different VoiceForm applications can be supported by the VoiceServer. The package costs \$4,000.

# As networking takes over the world, Network World takes over the market.

The trend has never been clearer. Networking is now the major application market for communications. And a recent statement by Ken Olsen, President and Founder of Digital Equipment Corporation, substantiates this trend: "We have to start thinking of the computers as peripherals. You start with the network, then you hang the computers on later."

Networking. It's been *Network World's* focus from the very start.

In fact, it is the *only* publication that covers the entire realm of communications from the networking point of view. And in doing so, *Network World* has established itself as the *standard* for communications users already networked or planning to network.

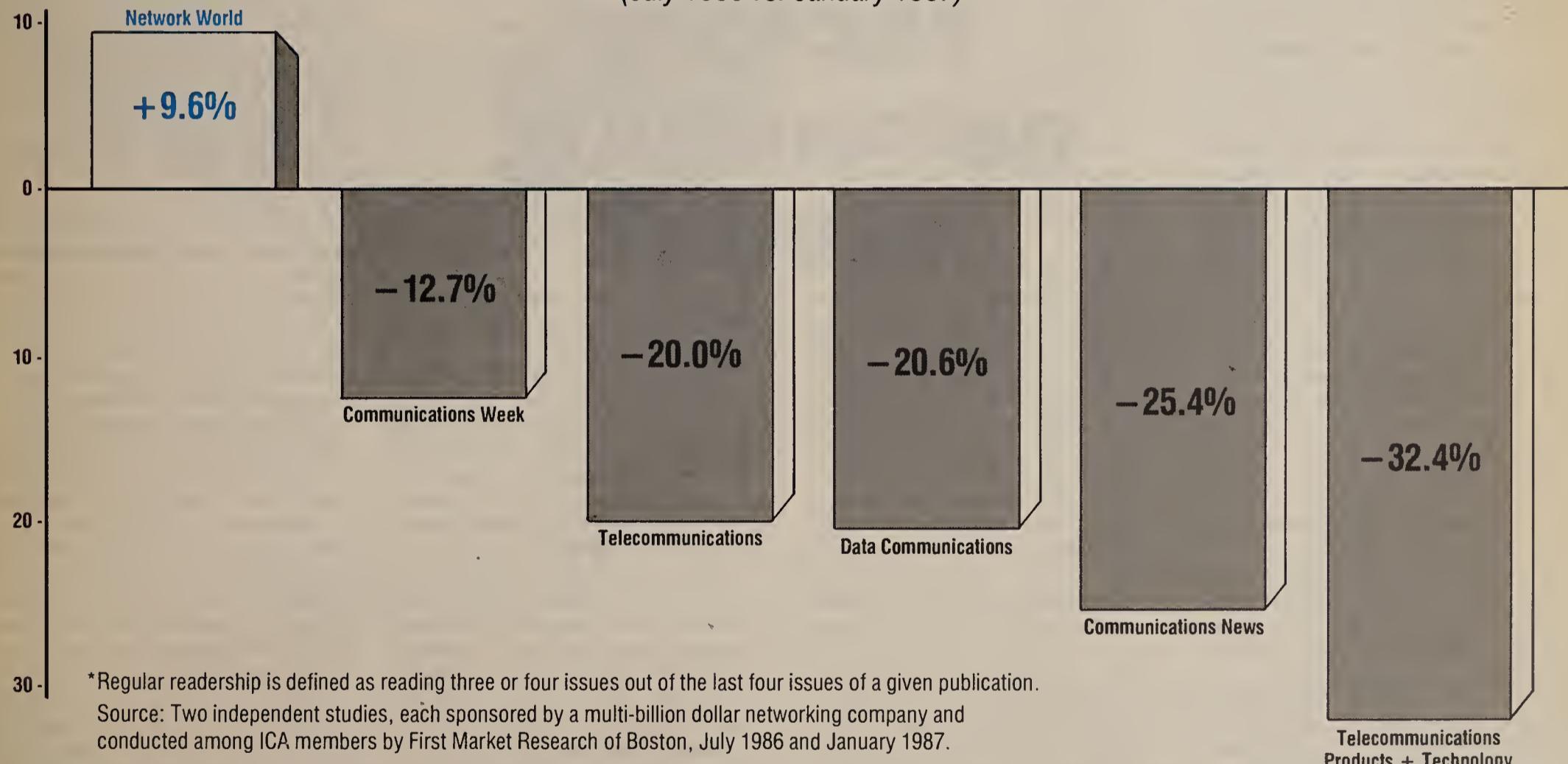
Today's users know they need up-to-date information in order to keep pace with the evolving world of networking. That's why they read *Network World*. And that's

why *Network World* was the only publication to gain in regular readership in an independent study conducted among ICA (International Communications Association) members, some of the nation's most influential buying decision-makers for voice and data communications products and services.

The study, sponsored by a multi-billion dollar networking company and conducted in January 1987 by

First Market Research of Boston, showed decreased readership of all communications oriented publications among ICA members since a previous study in July 1986. Only *Network World*, with its exclusive networking-oriented coverage, experienced an increase in regular readership. The percentage increase/decrease for each publication over that six-month period is displayed in the following chart.

Percentage Change in Regular Readership\* among ICA Members  
(July 1986 vs. January 1987)



\*Regular readership is defined as reading three or four issues out of the last four issues of a given publication.

Source: Two independent studies, each sponsored by a multi-billion dollar networking company and conducted among ICA members by First Market Research of Boston, July 1986 and January 1987.

Because networking is your business, we've made it our business. No other publication looks at the world of networking like we do. Today the network is the market - and the market reads *Network World*.

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# Opinions

Digital Equipment Corp. President Ken Olsen recently set off fireworks by saying that in manufacturing automation, Ethernet (IEEE 802.3) is a

practical alternative to the Manufacturing Automation Protocol broadband token bus (IEEE 802.4).

However, both MAP and Ethernet are too valuable to pit against each other in the kind of win-or-lose fire storm that sells newspapers but does little to advance manufacturing automation.

Let's not return to the fanaticism that ruled IEEE Project 802 back in 1982. Instead, let's reposition MAP to be independent of the transmission media. Let's also consider using Ethernet, now by far the most widely installed local-area network technology, as an alternative to the broadband token bus in some manufacturing automation applications.

The General Motors Corp.-led MAP team bit off more than it could chew when it took on three major standardization projects. Not only did it take on the problem of establishing standards for MAP, it also assumed the problems of perfecting communications transport, or Open Systems Interconnect (OSI), standards and establishing standards for untried broadband token bus localnet technology.

To the MAP team's credit, there are now some manufacturing automation protocols. MAP also got off to a good start by recommending use of emerging OSI protocols, instead of starting from scratch on transport. However, the MAP team headed down the wrong road when it based its work on broadband token-bus technology.

Two mistakes were made. First, well-structured networking architectures should be independent of transmission media. The current MAP is not. Second, MAP chose the wrong medium. The second problem would be solved almost automatically if the first is fixed.

From its earliest days, MAP chose the broadband token bus for its local-area net transmission medium. This was back when IEEE Project 802 was struggling to find a compromise between Ethernet — proposed originally by DEC, Intel Corp. and Xerox Corp. — and the Token-Ring Network, which IBM later proposed.

The broadband token bus (IEEE 802.4) was designed to

*Metcalfe, chairman of Santa Clara, Calif.-based 3Com Corp., invented Ethernet at the Xerox Palo Alto Research Center in the early 1970s. He also serves on the executive committee of the Corporation for Open Systems.*

## PRO:

BY ROBERT M. METCALFE

Special to Network World

combine and improve upon the best features of both — bus from Ethernet and token from ring — with the addition of broadband that neither had.

How wonderful it sounded then. The problem was that this technology did not then exist and, as happens to most untried technologies, it was oversold using invalid arguments that still reverberate around the industry.

Many people still assume that because Ethernet is baseband, it is susceptible to electronic noise in the factory. Ethernet cable is quadruple-shielded and has extremely good noise immunity. Further, Ethernet-compatible fiber-optic systems offer complete noise immunity.

Another false assumption is

## CON:

BY TONY HELIES

Special to Network World

The Manufacturing Automation Protocol standard was developed specifically to meet factory floor communications requirements. The

IEEE 802.4 token-bus protocol was selected as the foundation of MAP because it more effectively meets these requirements than the IEEE 802.3 (Ethernet) or 802.5 (token-ring) standards.

Factories have many unique characteristics that must be considered when selecting a communications network. The typical factory stretches over several square miles, operates within a harsh physical environment and contains many different industrial systems with real-time requirements. The token-bus standard, because of its token-passing pro-

tory communications. Two advantages of baseband are its large bandwidth and inherent flexibility.

In a broadband network, the available bandwidth is subdivided into channels — MAP, for example, specifies three channel pairs — which allows more than one network to share a single cable.

Broadband also supports data, voice and video, which means the same cable can support, for example, a communications network, video monitoring system and energy management system.

Another advantage is that broadband networks can extend as far as 25 miles. This means a single network can support communications throughout the manufacturing complex without bridges or repeaters.

Second, broadband is more immune than Ethernet to signal interference commonly found in factory environments. Ethernet's baseband signaling operates at the same frequency level as ambient noise generated by machine tools, lathes and other factory equipment.

By contrast, broadband signals are modulated and translated to a higher frequency that is less susceptible to factory noise.

Baseband is also more flexible to configure. For example, a tap may be placed anywhere on a broadband network. By contrast, an Ethernet specifies a minimum distance of 2½ meters between nodes.

Finally, broadband has long been used in the cable television industry and is a readily available and reliable technology.

IEEE 802.4 networks are used for many applications that would be less efficiently served by Ethernet. For example, a leading manufacturer of aluminum forgings uses an IEEE 802.4 network for facilitywide networking. The manufacturing complex stretches through 15 buildings and contains energy-intensive, harsh industrial operations.

One network channel is used to support manufacturing administration, plant maintenance systems and floor controllers. A second channel supports an energy management system, and a third is used for computer-aided design and manufacturing engineering stations. The network allows any system in the plant to be accessed from a single location.

Since this manufacturing environment is machinery-intensive, Ethernet would be less efficient because of its susceptibility to ambient noise.

Also, a single Ethernet could not satisfactorily handle the processing load resulting from interconnecting the plant's entire data

## Is Ethernet sufficient for factory networking needs?

that token passing is deterministic in the sense that users are guaranteed access within a maximum time, and that because Ethernet doesn't use tokens, it can't deliver data reliably in the time required by real-time manufacturing equipment.

People who think tokens will circulate deterministically around token buses are overlooking the probability of errors — from which Ethernet, unlike the token bus, was built to recover robustly.

Further, the requirements for timely delivery of data in manufacturing automation are grossly overstated, and the ability of Ethernet to meet these requirements under heavy loads is underestimated. I question people who say manufacturing systems are designed such that they could become dangerous if network data is not delivered reliably through a kilometer of cable in a few milliseconds.

After building a 10M bit/sec broadband token bus, the MAP team didn't go back to accept Ethernet. Instead, it invented three new media and transmission methods, the most widely used of which is proposed to be a new,

See Pro on next page

token and broadband medium, provides optimal communications in this environment.

Token passing ensures deterministic access to the local-area net, as only a station possessing the token can transmit. The protocol also supports a four-tier message-priority scheme, which lets time-critical systems access the network first.

By contrast, Ethernet uses carrier-sense multiple access with collision detection, a contention scheme in which nodes listen to the line before sending. With CSMA/CD, the probability of collision, and thus retransmission, increases as network load increases. In a typical factory network, which supports hundreds of real-time devices, a deterministic access method is more efficient.

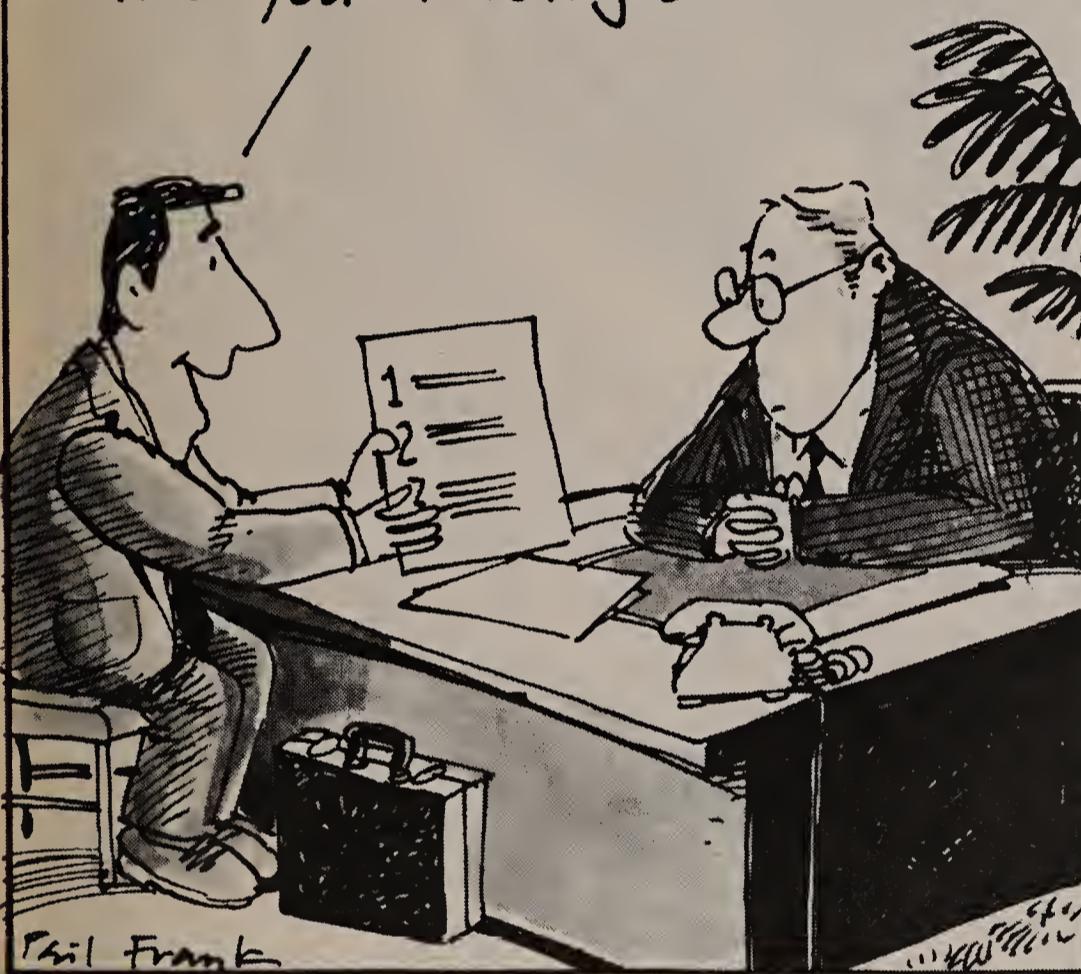
Unlike Ethernet, which uses baseband signaling, IEEE 802.4 also specifies a broadband medium, which is well-suited for fac-

*Helies is president of Concord Communications, Inc., a manufacturer of MAP-based local-area networks in Marlboro, Mass. He has over 17 years of experience in the computer and industrial automation industries.*

# Opinions

## ►TELETOONS — By Phil Frank

We offer a complete network package.. We install the operating system, configure the software and when none of it works we find you a new job.



processing and manufacturing systems.

Further, Ethernet would not even support an energy management system. Finally, the amount of cabling required to network a 15-building complex would overwhelm Ethernet's distance limitations, even if repeaters were used.

One of the world's largest manufacturers of fuel consumption systems also uses an IEEE 802.4 network for process control. Workstations, engineering and quality control terminals use the network to access data from factory floor controllers. This data is collected and analyzed to achieve zero-defect production.

In conclusion, an IEEE 802.4 network is the optimal solution for factory communications.

The combined characteristics of token passing and broadband effectively meet the extended distance, noise immunity, flexible integration and broad utility required for real-time communications within a manufacturing facility.

It was the recognition of these factors, as well as practical experience, that made MAP's authors select IEEE 802.4 as the world's first standards-based network for factory communications. □

**Pro** from previous page  
slower local-area net technology called carrier band.

Whereas Ethernet was unacceptable because it is nondeterministic baseband, MAP now relies on its own carrier band, which is — guess what? — baseband by another name.

If extreme noise immunity is so important, and baseband doesn't have it, why is carrier band acceptable? And what about the assumptions of determinism?

Previous arguments about the relative determinism of token bus and Ethernet have assumed both were running at 10M bit/sec. But who can argue that a heavily loaded 1M or even 5M bit/sec carrier band MAP network can ensure greater probability of timely data delivery than a 10M bit/sec Ethernet?

The good news is that the fanatics are calming down. Media independence is already being achieved through the Corporation for Open Systems and the merger of MAP and Boeing Computer Services Co.'s Technical and Office Protocol.

The issue of how best to move packets around factories has been opened up, and Ethernet is getting its day in court. □

## DEPARTMENTAL SYSTEMS BRIAN JEFFERY

# The IBM Rain Dance

In many primitive cultures, the Rain Dance was a central custom. Entire villages assembled, donned costumes and danced for hours, chanting — usually in vain — for rain.

For some time now, the public has been treated to an IBM Rain Dance aimed at creating demand for departmental systems and IBM 9370s. Chanted rumors are heard through the industry: IBM has 50,000 orders for the 9370, no, 100,000. They are the preferred departmental system. People are queuing up for them. Meanwhile, IBM has only a few hundred units out the door, and the press is frantically combing the land for the apparently mythical 9370 user.

Consultants help. They're forever defining what a departmental system should be and how personal computer users should be able to talk to mainframes.

The 9370 can do all this, they say. Gosh, it's just what we've been saying departmental systems should look like. There's a big market for departmental systems. Ergo, there's a big market for the 9370.

According to senior management in IBM's Systems Products Division, Big Blue sees the 9370 "opportunity area" as about 50% "small and medium business," 35% to 40% "distributed computing" and only 10% to 15% "departmental systems."

What, then, of the great IBM hype for departmental systems?

Some senior IBM managers will admit, reluctantly, that they don't really believe in them. IBM doesn't use departmental systems much internally. It uses many personal computers, but otherwise, it's mostly mainframes and the Professional Office System that handle office applications.

The picture gets more murky when the question is asked: "How many orders does IBM actually have for the 9370?"

Consultants and market researchers use the figure of 50,000, which was originally provided by IBM. With a little prodding, IBM management admits that, er, well, um, that's a round number. The backlog,

*Jeffery is managing director at the International Technology Group, a Los Altos, Calif.-based research and consulting firm specializing in the IBM market.*

they admit, is a little soft.

Much of that 50,000 figure consists of commitments, people who have been reserving a place in the order queue and who might not actually buy the things.

Even more disturbing for IBM is that a high proportion of the "orders" are replacements for 4331 and 4341 machines installed from 1979 to 1983. Many of these are still on lease — IBM didn't start making leasing unattractive until 1982 — and the 9370 is gleefully received as an excellent replacement.

The problem for IBM, of course, is that 9370 replacement orders will start dropping like a rock when the old 4300 base has turned over. It will be the final act of IBM's great rental-to-sales conversion push, which contributes to Big Blue's growth slowdown.

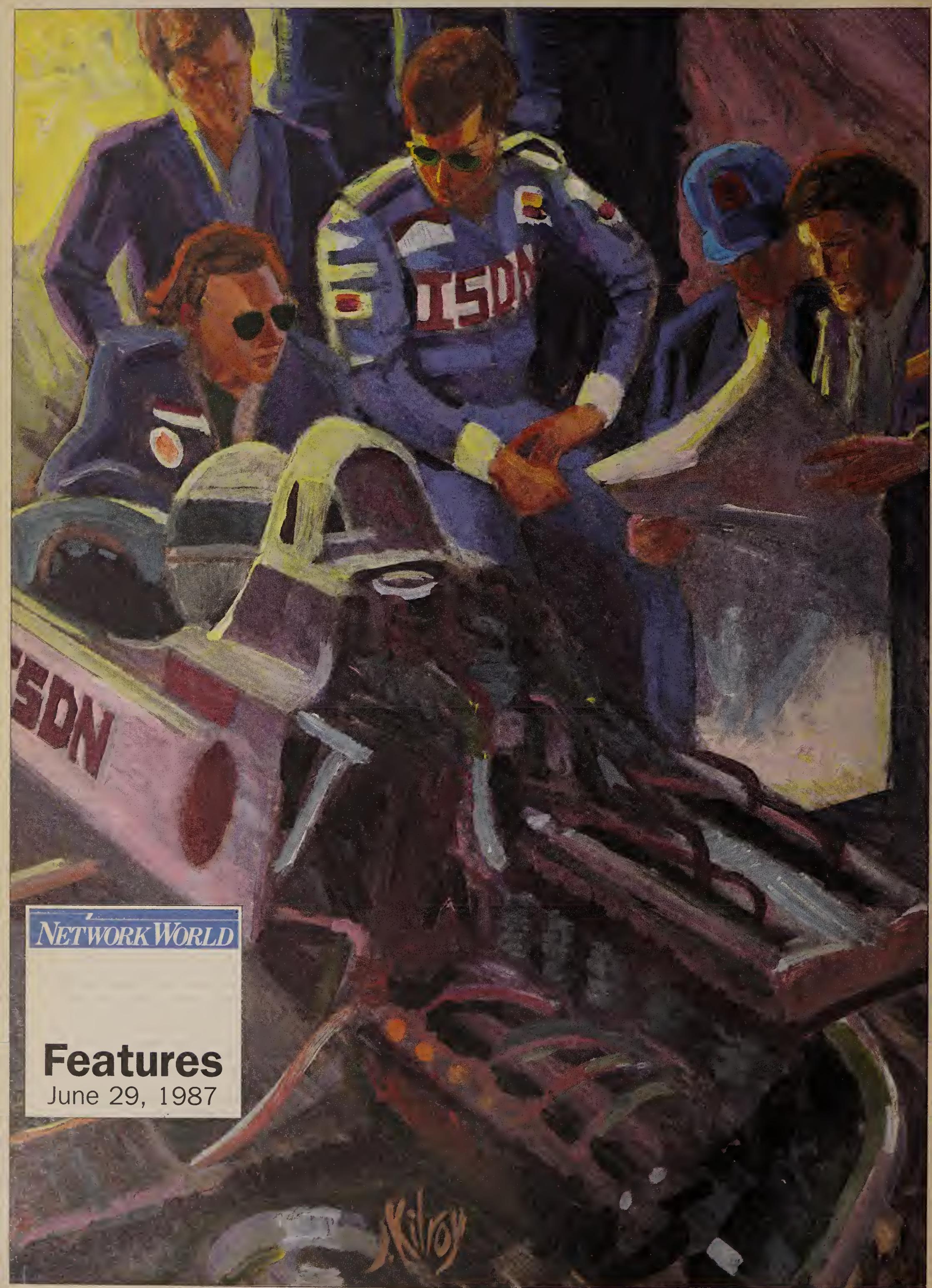
What, then, of those Fortune 500 accounts that are ordering 9370s by the thousands? IBM proudly points to 1,000-unit and 2,000-unit orders. But prod IBM some, and it will admit that a lot of these are multi-year orders.

IBM also inadvertently tipped its hand with the proud statement that production will be fully sufficient for demand in the fourth quarter. This is one of those inoffensive-looking statements that turn out, on closer examination, to be bombshells.

No backlog by Christmas? In a few months, IBM will have filled a supposedly massive demand that has had a year to build up? From the way everyone was talking, it sounded as if 9370s were going to be rationed well into 1988. There's something rather suspicious about this.

It is obvious that the 9370 has been grossly oversold and that the whole idea of departmental systems is, itself, a rather tiresome exercise in hype resting on a very dubious foundation of reality. It is all reminiscent of a Rain Dance.

Fortune 500 companies use lots of minis. Sometimes they buy more; sometimes they replace what they have. Sometimes they use them in a way that might be described as "departmental systems." The IBM Rain Dance won't change any of that, one way or the other. □



NETWORK WORLD

## Features

June 29, 1987

## Special Section: ISDN

# Circuit strategies

*Uncertainties have many managers plodding the course.*

BY MARY JOHNSTON  
Special to Network World

Long-term success in any technological endeavor requires that all participants weigh the risks and advantages of multiple alternatives.

The advantages of the Integrated Services Digital Network concept — to provide a limited set of user interfaces and protocols capable of supporting ubiquitous, feature-rich digital communications — are endorsed by all. However, the current lack of technological standards poses great problems and risks for managers attempting to plot long-term communications strategies.

Some companies are choosing to ignore ISDN until it's proven in the market. Others are investing extensive resources in technology trials. Many organizations are taking the middle ground, using the acronym in plans but still feeling uneasy about its yet to be demonstrated advantages.

*Johnston is a senior consultant with BBN Communications Corp. in Cambridge, Mass.*

Whatever strategy is being considered, it is likely to be an attempt to avoid investing in equipment and services that may soon be obsolete while having few hard facts on which to base an assessment.

The list of uncertainties regarding ISDN is headed by the following:

■ **Standards.** Organizations continue to bicker over ISDN services, functions and protocol coding. Users resist investing in technologies that may have to undergo extensive upgrades due to changes in standards. In particular, ISDN support for private packet data networks and local-area networks drags way behind specifications for voice services.

■ **International divergence.** Multinational companies are acutely aware of variations in North American and European communications standards. Users cannot be

guaranteed how well international ISDNs will interwork until the 1988 Consultative Committee on International Telephony and Telegraphy plenary session is concluded, codifying the international consensus on ISDN standards for the next four years.



■ **Enhanced services.** Early ISDN demonstrations have exhibited few unique applications. For the most part, they mimic services available through conventional technologies. Vendor scenarios for proposed value-added services are often predicated on ISDN being almost universally available, when in fact it will come first to isolated metropolitan "islands."

■ **Pricing.** No vendor in ISDN development, whether it is a local telephone company, long-distance carrier or customer premises equipment manufacturer, has provided detailed pricing information for ISDN. Lack of this information

*Continued on next page*

From previous page  
makes cost/benefit analysis impossible.

All of the above are solid reasons for skeptical responses to ISDN. And, indeed, they are precisely why both vendor deployment and user acceptance will be slow.

But despite the fact that ISDN is unlikely to really make a difference to most U.S. users until 1992 — perhaps 1990 in Europe — it has crossed over the planning horizon and now must be treated seriously.

Effective communications management and strategy requires planners to evaluate ISDN with healthy skepticism. They must design long-term network architectures that can take advantage of ISDN yet also enable the adoption of alternatives if ISDN fails.

#### A child of the telcos

To understand why ISDN looks as it does today, one must recall that it is the child of telephone companies: AT&T, the Bell operating companies and the national Post, Telegraph and Telephone administrations of Europe.

These organizations have been forced to develop ISDN in response to requirements for better operational and management support for public common carrier networks. Development has been tied closely to the fact that digital circuits have been largely unavailable in Europe until recently.

Consequently, ISDN will be introduced just as the European networks begin to make end-to-end digital services commercially available. The American telephone companies, by comparison, have supported digital services for some time via the digital data service network, which is maintained separately from the basic dial-up network.

Given that the bulk of money spent on communications goes to voice services, it is not surprising that early ISDN standards efforts have made voice, or circuit-switched, networking the top priority. And, given the domination of international standards activities by the PTTs, it is not surprising that standards for premises equipment and interworking with private data networks were given low priority.

The insistence of competition-oriented U.S. companies has caused the CCITT to give priority to studying standards for issues such as private branch exchange-to-private branch exchange interworking, packet mode standards, schemes for merging public ISDNs and private local-area networks, and network interface standardization.

In some cases, such as PBX-to-PBX links, the standards will build on protocols already developed. In other cases, such as interworking with packet networks, the current thought is to develop a slow evolutionary path.

Packet mode standards are a particularly sensitive issue. The U.S. market supports a large number of private packet networks,

while many European countries have only one public packet option. Current U.S. ISDN/packet connection standards efforts, on which the current ISDN trials are based, rely on circuit-switched ISDN connections to non-ISDN packet handlers owned by the packet network, not the telephone network.

The only ISDN element is the use of the Q.921 and Q.931 protocols for the setup and tear-down of the circuit-switched connection.

Current standards call for true packet-switched connectivity as

**Despite the fact that ISDN is unlikely to really make a difference to most U.S. users until 1992, it must be treated seriously.**

packet handler modules are added to ISDN central systems.

Interconnection of ISDN-based equipment and local networks is a more difficult issue. The 1.5M bit/sec-to-2M bit/sec range primary rate of ISDN is greatly outstripped by the throughput supported by local nets. That throughput is currently 10M bit/sec and will soon approach 100M bit/sec as use of fiber-based local net technology grows.

Standards for local-area networks and ISDN interworking are likely to stagnate until wideband ISDN channels are defined.

As the 1988 CCITT plenary approaches, the U.S. delegation will be quite active in requesting that attention be paid to these issues.

However, the PTTs in the CCITT membership may prefer to allocate resources for improving telephone company functionality, rather than worrying about private network issues.

Consequently, it is difficult to determine how many U.S. priorities will be addressed.

Should significant issues be ignored by the CCITT, the North American standards groups such as T1D1 may be forced to issue their own North American subset of ISDN standards.

These would only be binding on equipment developed for the North American market. This could result in significantly different North American and international ISDN functions and capabilities between 1988 and the following CCITT plenary in 1992.

For multinational users, such a move would eliminate any hope of unifying American and European equipment procurements. For vendors, it would increase the amount of money needed to be invested in ISDN development, raising user costs and slowing development of

enhanced features.

#### Networks can't wait

The business requirements of corporate telecommunications cannot wait for the deliberations of international standards groups. Many organizations are racing to install integrated T-1 backbones, local-area networks, intercompany data networks, integrated voice/data management systems and a vast array of other solutions to existing problems. For the most part, these solutions are dependent upon equipment using proprietary, non-ISDN-based protocols.

Even the BOCs, which have the most to gain by steering clients toward ISDN, are offering alternatives. While Pacific Bell has been planning its Bay Area ISDN trial for July 1987, it has also been actively testing Project Victoria, an "integrated" residential service, which bears no resemblance to the ISDN standards.

ISDN calls for a basic 2B + D interface — two 64K bit/sec data channels and one 16K bit/sec signaling channel — to replace the line into most residences. The Project Victoria interface provides for up to seven different information channels: two for voice, one for medium-speed data and four for low-speed data.

Its goal is to provide residential users with a wide array of entertainment and personal electronic services, including data base access, home banking, meter reading and others. The service is based on existing multiplexing technologies and does not use any ISDN protocols.

BellSouth Corp. offers a similar multiplexer-based alternative aimed at business applications via its Simultaneous Voice and Data

**Even the BOCs, which have the most to gain by steering clients toward ISDN, are offering alternatives.**

Service. However, due to a recent FCC ruling requiring that the Project Victoria multiplexer be treated as customer premises equipment, rather than as an element of the BOC network, previously scheduled market trials are on hold.

As ISDN is introduced, the BOCs must decide upon pricing incentives to steer users toward ISDN or to proprietary multiplexer-based services, as appropriate.

Users with low-speed data requirements may find that the proprietary applications are more attractive financially and do not require the use of terminal adapters. These proprietary services are likely to play a transitional role, providing ISDN-like environments

to users while extending the useful life of existing terminals.

Interested users should scrutinize carrier ISDN pricing decisions and the price differential between ISDN and proprietary services. With the telephone companies hedging their bets, it would be wise for users to consider their alternatives.

#### Evolutionary technologies

The ISDN of the 1980s, featuring 64K bit/sec basic rate access, will not be the end of network technology development. Already under development are the 100M bit/sec Fiber Distributed Data Interface, 135M bit/sec-plus wideband ISDN and high-speed, hybrid circuit/packet switches.

But, telecommunications managers must make procurement decisions while these technologies are being refined. Users should plan for the ability to interwork with ISDN common carrier services and evaluate the role ISDN can play at the customer premises level.

In some cases, ISDN PBXs connecting integrated voice/data terminals may be preferable to separate PBX and local network wiring schemes, at least at relatively low data rates. In other cases, high-capacity dedicated local-area networks may be preferred. In either case, users should buy from vendors that have demonstrated plans for accommodating ISDN in the 1990s.

If a corporate decision is made in favor of ISDN, it is important that it be presented as a long-term strategy, not a solution to be enacted in 1987 or even in 1988. Users interacting with European networks will encounter some ISDN applications in 1988 and 1989, but most domestic users will see few of its benefits until 1991 or 1992.

From 1988 through 1991, ISDN will be given the opportunity to prove itself to American users. The majority of companies can learn from the few technological trailblazers, such as hamburger empire McDonald's Corp., that will be participating in ISDN trials during this period (see "Users reflect on ISDN trials," page 31).

The next two to three years will be an excellent period for considering ISDN's impact on corporate networks in the 1990s. Equipment bought today should be upgradeable, in case ISDN functionality is proven beneficial.

Over the next five years, many users organizations will opt for integrated environments. A good number of these will rely on T-1 backbones, supported by non-ISDN proprietary multiplexers and protocols. The aim will be, as it is today, to adequately support the business of the corporation in a cost-effective manner.

So long as there is a plan for smooth migration between these implementations, as well as between eventual ISDN standard protocols and interfaces, users should not have to suffer the costs of early equipment obsolescence.

With regard to ISDN, corporate planners should first focus on

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## Special Section: ISDN

# Users reflect on ISDN trials

*Early users judge the BOCs' initial integrated offerings.*

### Continued from page 1

Testing of advanced voice features has generally been held up because software supporting these capabilities is not yet available. ISDN trial participants with private branch exchanges don't seem to mind, however, because they're already familiar with promised voice features such as call forwarding and call waiting.

#### What's hot

The hottest ISDN voice application tested so far is caller identification. The calling party's telephone number is listed on the small display screen on the called party's

digital telephone set. If the called party is away from his desk, his telephone will indicate, on screen, that a message is waiting. The current drawback is that only individuals connected to the same ISDN switch can identify each other.

ISDN's ability to handle voice and data simultaneously is virtually taken for granted by trial participants. Although most trial users are testing integrated voice and data, many mentioned it as an afterthought. One popular application under evaluation is interactive editing, in which two users simultaneously view and update a document while discussing it over the telephone.

By contrast, few telecom manag-

ers are testing video applications. "The quality of the video right now is like communicating with Mars," says Murray Robertson, marketing planning administrator for General Telephone Co. of California. Intel Corp.'s Corporate Telecommunications Senior Strategist Donald Melvin, who tested videoconferencing as part of a Mountain Bell trial in Phoenix, agrees that the video now available over ISDN is not of commercial quality.

Melvin isn't giving up on videoconferencing, however. "We realize that a year from now the video compression algorithms will be twice as good as they are now," Melvin says. Intel had been looking

Continued on next page



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into setting up a private ISDN network before being asked to participate in the trials, according to Melvin.

A more popular application is high-speed facsimile transmission. Earl Vogt, telecommunications manager at U.S. National Bank of Oregon, has tested Group IV facsimiles operating at 64K bit/sec with Pacific Northwest. Several telephone companies, including Mountain Bell and General Telephone of California, also plan to test high-speed facsimile during their internal trials.

Equal access for all

ISDN is creating the most excitement, however, in its ability to provide ubiquitous access. Trial participants are impressed with the sheer range of equipment that ISDN can connect.

The State of Arizona's Department of Administration, another Mountain Bell trial participant, exemplifies this: The agency is using ISDN to link just about every conceivable combination of computers and terminals.

Connections in this trial include mainframes to minicomputers, minicomputers and mainframes to asynchronous terminals, mainframes to personal computers and 3270 emulation.

Many of these connections are made using terminal adapters,

with communication occurring over the B channel, says Matthew Whittington, communications network engineer in the Data Management Division of the Department of Administration.

For terminal-to-mainframe communications, Whittington is also testing X.25 for use over both the B and D channels. The packet-switching technology allows for shorter sessions with the host, which means more terminals are able to share one front-end processor, Whittington says. In addition,

sources. Packet switching offers some great features, such as precise billing information."

Speeds are impressive

Like Whittington, many other trial users are enjoying the increased data transmission speeds and line consolidation ISDN provides. "I'm impressed with the baud rate increase," says Emil Karau, manager of telecommunications networks at Honeywell Bull, Inc.'s Phoenix operation. Honeywell cut over roughly 40 ISDN

points at the second site via ISDN lines. "Instead of using three or four private circuits, we're using one ISDN line," Karau says.

Intel also began its trial in the Phoenix area in February, says Melvin. "Users are happily using ISDN as if it were their one and only way of communicating," Melvin says. "Some of them are a little hesitant to give it up because it improves their service considerably."

The Intel users who have seen the biggest performance jump are those whose terminals were previously tied via coaxial cable to a local cluster controller. The controller was, in turn, linked to a remote host via a 56K bit/sec line. As a result, the 32 users whose terminals were hardwired to the controller had to share a single 56K bit/sec line.

Now, users' terminals are tied directly to an ISDN line. Using an AT&T product that Melvin calls a throttle-down device, the data stream from the 3270-type terminals is put onto the ISDN line at 64K bit/sec. The data travels to the central office, where it is switched to the remote host computer. A second throttle-down device sits in front of the cluster controller, which is now channel-attached to the host.

"Each user now gets more bandwidth than the whole cluster controller used to get, so the response

Continued on page 35

## ISDN is creating the most excitement, however, in its ability to provide ubiquitous access.

packet switching provides both security and a way to account precisely for mainframe usage.

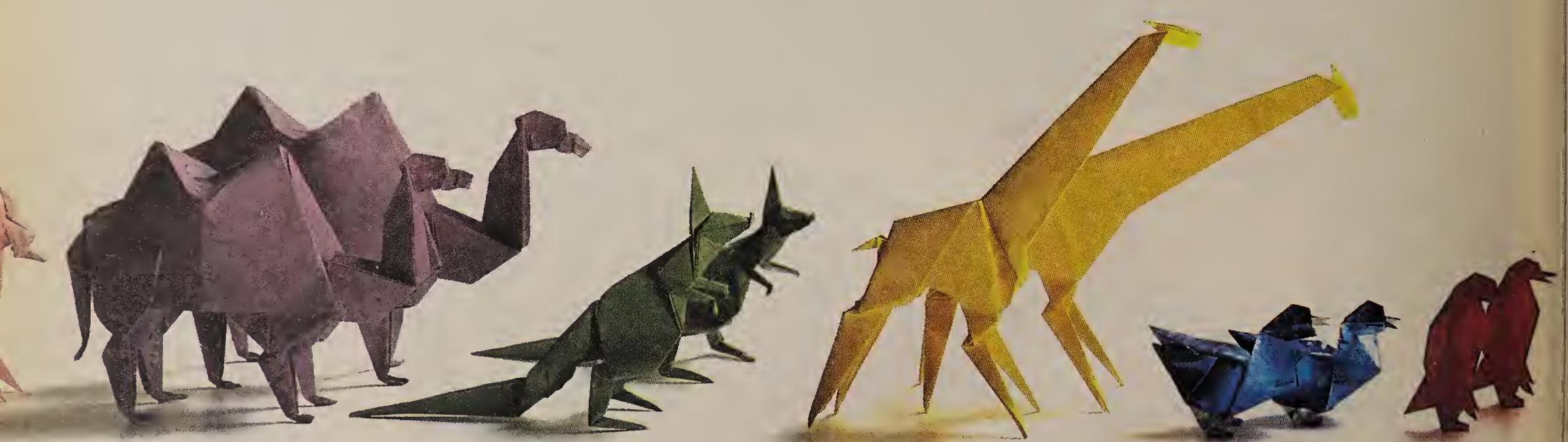
"Sharing is a key word for us — it's something we look for in our trial applications," Whittington says. "We're looking for ways ISDN can be configured to become a highway for people wanting to access our data centers. Using ISDN, we can manage, with great precision, not only the physical connection, but the necessary accounting and security that comes along with managing shared re-

lines in February. Two facilities seven miles apart are linked, and ISDN lines have replaced dial-up lines used to communicate between the two sites.

"Our normal dial-ups are 1,200 baud," Karau notes. "We're now running 9.6K baud, so you're looking at an eightfold increase in the transfer rate."

In addition, computers at one site that are responsible for building control, including monitoring of fire and temperature sensors, also control environmental check

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# ISDN at home under the golden arches

When McDonald's Corp. put out a request for proposal in late 1984 for an alternative to the Centrex system at its Oak Brook, Ill., headquarters, the company didn't realize it would be pioneering a new technology.

However, when Illinois Bell Telephone Co. responded to the RFP with an Integrated Services Digital Network-based solution, McDonald's saw an opportunity to get the voice, data and messaging capabilities it was after. The hamburger giant signed up for an early trial and will be one of the first corporations to implement ISDN when its new headquarters opens in mid-1988.

Like many other ISDN trial participants, McDonald's has been testing mostly data applications since its trial kickoff last December, according to Pat Krause, staff director of telecommunications.

These applications include personal computer-to-personal computer file transfer, asynchronous terminal-to-asynchronous host access, asynchronous terminal- or personal computer-to-IBM host access and 3270 coaxial ca-

ble elimination.

McDonald's is also using X.25 over ISDN lines to access host computers. Modem pooling is being tested, as is Group IV facsimile. Currently, 70 ISDN lines are installed, and that number is expected to grow to about 120 lines this summer, connecting four of the company's five locations in Oak Brook, Ill.

"One of the things we hope to get out of the trial is to study the pros and cons of circuit-switched connections vs. packet-switched connections and to decide what applications work best with what kinds of connections," Krause says.

Enhanced voice features will be brought on-line late this year when new software is available for the AT&T 5ESS switch being used in the trial. Early in 1988, after the new software is in place, Krause expects to add 300 to 400 users. Message capabilities inherent in the switch will be tested, as well as voice mail and automated message desk functions.

McDonald's home office now houses 1,800 people in five loca-

tions, all supported with Centrex. "We currently have about a 2,000-line Centrex," Krause says. "When we open up the new building, I would expect we would have somewhere around 1,000 ISDN lines." Between 700 and 800 people will move to the new building, and many of them will be added to the trial.

Krause is pleased with ISDN's

## McDonald's uses X.25 over ISDN lines to access host computers.

capabilities so far and with the progress of the trial. "There are a lot of issues that have to be worked through, but that's to be expected with any kind of new service like this," he acknowledges.

ISDN will provide two important benefits for McDonald's, Krause believes. "One benefit is

providing an information outlet to the desktop — not just a voice capability, but voice, data, image and messaging all through a single information outlet and a uniform wiring plan," Krause says.

The second benefit ISDN provides is in terms of wide-area networking. "We have many different networks between our home office and our field offices," Krause notes. "Our hope is that, as ISDN becomes available on a widespread basis around the country, we can use it to network our field locations and even our stores, eventually. We'd like to have a single network rather than 10 or 12 different networks supporting our field locations."

Krause realizes that Signaling System 7 will have to be implemented before the islands of ISDN can be interconnected, but he thinks this technology will be available within two years. One thing is certain: As ISDN implementations spread, McDonald's plans to be ready to roll with them.

— Mary Petrosky



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time on the terminals is much faster," Melvin says.

Several trial participants have selectively eliminated coaxial cable by using ISDN's twisted-pair cabling to link 3270-type terminals and personal computers to mainframes.

This wiring scheme proved a boon when John Amidon found he had to move several ISDN data terminals. "Movement was easy because we didn't have to restring coax, which was a plus to us," says Amidon, manager of technical support for the Arizona Department of Transportation, another Mountain Bell trial participant.

### Users sign on

ISDN's connectivity promise is so strong that it has lured several companies to sign up for early commercial offerings. Prime Computer, Inc. will be taking advantage of Southern Bell's initial ISDN services in Atlanta, while Tenneco, Inc. has signed up for services from Southwestern Bell.

"We're looking at how ISDN fits the needs of the local-area network and terminal- or workstation-to-host connections," says James FitzGerald, product specialist in Prime's Natick, Mass., headquarters. "We think ISDN offers a single topology for a local-area network and will for a wide-area network when interworking of switches is available.

"Essentially, with the same interface and same type of terminals and networking equipment, I can access my local computer or one across the country with the same

response-time characteristics. It's very attractive," FitzGerald adds.

Prime initially will be implementing ISDN in a sales office. All applications under consideration are data-oriented and will include casual and heavy data users accessing host computers via terminals and personal computers.

Tenneco's plans are more wide-ranging. Its Houston operation includes the oil company's headquarters as well as the headquarters for its various divisions, all of which share facilities, says John Saccante, director of telecommuni-

backbone for a wide variety of current as well as not-yet-defined applications," he notes. These applications include interconnecting personal computers, 3270-type terminal-to-mainframe links and integrated voice and data for general data base access.

"In our kind of environment, the only hope of a pervasive capability like this is via an evolution of the telephone system. Otherwise, you're going to continue to have a proliferation of departmental solutions and special applications," Saccante adds.

**Although FitzGerald and Saccante say they can't disclose figures, both agree that the cost of ISDN would be less than twice their normal line rate charges.**

cations. The company wants to lay down an infrastructure for developing information systems over the next few years.

Currently, Centrex acts as a common thread for connecting the various divisions, but it has proved inadequate, Saccante says.

Although other services can provide ISDN-like capabilities, "ISDN adds that very important promise — of greater flexibility, wider terminal availability, better economics and so on — that standards bring with them," Saccante says.

"We want to provide a general

As actual customers for ISDN, FitzGerald and Saccante have come the closest to knowing how the technology will be priced — at least initially. Although they say they can't disclose these figures, both agree that the cost would be less than twice their normal line rate charges. This is the same price range most trial participants have heard bandied about. The telephone companies also declined to provide pricing figures.

Line charges aren't the only costs that need to be evaluated, however. "Most large companies



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have a considerable investment in equipment, modems, networks and everything else," Honeywell's Karau says. "With ISDN, you may not call terminal adapters and [network termination devices] modems, but they're a facsimile of a modem. And you still have the expense of implementing them at both ends."

### Trial limitations

Like other trial participants, Karau is enthusiastic about ISDN's potential, but has bumped up against the limits of ISDN technology as currently implemented. Because the trial he's in involves only one central office, "we can't get a very broad view of ISDN," Karau says.

"A lot of the functions that will be in the future ISDN aren't there right now — the ability to go into the central office and balance your own load, or to reassign your phones — things we could do on our internal PBXs," Karau says. "The basis of comparison with ISDN is very narrow right now. But once it's implemented, it looks like it'll be a very viable technology."

The trials and plans for early commercial offerings have had at least one interesting by-product: Users and vendors are developing new ways of working with one another. Several telecommunications managers believe that being in the trials has given them new status and clout with vendors.

"This has put us on a parallel with our vendor community," says the State of Arizona's Whittington. Continued on next page

### Domestic ISDN trials

Telephone operating company	Trial location	Trial type	Trial dates	Switch	Access method	Number of lines	Customer premises equipment vendors	Applications										
								file transfer	local/wide-area networking	packet switching	coaxial elimination	line consolidation	modem pooling	integrated voice and data	advanced phone features	security monitoring	video transmission	interworking of switches
General Telephone Co. of California	Thousand Oaks, Newbury Park, Ontario, and Norwalk, Calif.	Internal	June 1987-June 1988	GTE Communication Systems Corp. GTD-5 EAX	2B+D, 23B+D	60	GTE, others to be announced	✓		✓				✓	✓	✓	✓	
Illinois Bell Telephone Co. (Ameritech)	Oak Brook, Ill.	Customer: McDonald's Corp.	December 1986-mid-1988	AT&T 5ESS	2B+D	400	AT&T Network Systems, Fujitsu America, Inc., Harris Corp., Hayes Microcomputer Products, Inc., NEC America, Inc., Telrad	✓		✓	✓	✓	✓	✓	✓	✓	✓	
Mountain Bell (US West, Inc.)	Phoenix	Customer: Arizona State Government, Honeywell Information Systems, Inc., Mountain Bell	November 1986-September 1987	Northern Telecom, Inc. DMS-100	2B+D	200	Codex Corp./Motorola, Inc., Digital Equipment Corp., Fujitsu America, Honeywell Bull, Inc., NCR Corp., Northern Telecom	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
	Phoenix	Customer: GTE and Mountain Bell	January 1987-June 1987	GTE GTD-5 EAX	2B+D and 23B+D	15	GTE	✓		✓				✓	✓			
	Phoenix	Customer: Intel Corp. and Mountain Bell	February 1987-August 1987	AT&T 5ESS	2B+D	50	AT&T, others to be announced	✓	✓		✓		✓	✓	✓			✓
	Denver	Internal	February 1987-ongoing	NEC America NEAX 61E Adjunct	2B+D	96	NEC	✓	✓	✓					✓			
New England Telephone Co. (Nynex Corp.)*	Boston (four sites)	Internal	July 1987-first-quarter 1988	AT&T 5ESS	2B+D, 23B+D	50-100	AT&T, others to be announced	✓	✓				✓	✓				
New Jersey Bell (Bell Atlantic Corp.)	Navesink, N.J.	Research/customer: Bell Communications Research, Inc.	October 1987-spring/summer 1988	Siemens Communications Systems, Inc. EWS	2B+D	200	Siemens; experimental BELLCORE equipment, others to be announced		✓	✓	✓			✓	✓	✓	✓	✓
Northwestern Bell Corp. (US West)	Minneapolis and St. Paul, Minn.	Customer: to be announced	September 1987-ongoing	NEC America NEAX 61E Adjuncts	2B+D	To be announced	NEC, others to be announced	To be announced										
Pacific Bell (Pacific Telesis Group)	San Francisco Bay area (San Francisco, Sunnyvale, San Ramon, Calif.)	Technology test, customer test**	July 1987-fourth-quarter 1988	AT&T 5ESS (Sunnyvale); NEC America Digital Adjunct (San Francisco); Northern Telecom DMS-100 (San Ramon)	2B+D, 23B+D	60; 50; 100	AT&T, NEC, Northern Telecom, others to be announced	✓	✓	✓				✓				✓
Pacific Northwest Bell Telephone Co. (US West)	Portland, Ore.	Customer: U.S. National Bank of Oregon and Pacific Northwest Bell	March 1987-March 1988	Northern Telecom DMS-100	2B+D	200	Harris, Northern Telecom, others to be announced		✓	✓	✓	✓	✓	✓	✓	✓	✓	
Southwestern Bell Telephone Co. (Southwestern Bell Corp.)	St. Louis, Mo.	Internal test	June 1987-ongoing	AT&T 5ESS, Northern Telecom DMS-100, two others to be announced	2B+D, 23B+D	Maximum of 400	AT&T, Northern Telecom, others to be announced		✓	✓	✓			✓		✓	✓	✓

\* New York Telephone Co. is also planning a trial, but no information has yet been released on this. Also, Nynex Corp. is in the process of putting together a Network Services Development Center that will have three different switches and will be chartered, in part, to do limited ISDN trials.

\*\* Customers to be announced

SOURCE: NETWORK WORLD

### Domestic ISDN applications

Telephone operating company	Location	Customer	Date available	Switch	Access method	Number of lines	Customer premises equipment vendors	Applications									
								file transfer	local/wide-area networking	packet switching	coaxial elimination	line consolidation	modem pooling	integrated voice and data	advanced phone features	security monitoring	video transmission
Southern Bell Telephone and Telegraph Co. (BellSouth Corp.)	Atlanta	Trust Co. Bank of Georgia, others to be announced	March 1988	AT&T 5ESS	2B+D, 23B+D	To be determined	To be determined by customer	To be determined by customer									
	Boca Raton, Fla.	Prime Computer, Inc., others to be announced	July 1988	Siemens EWS	2B+D, 23B+D	To be determined	To be determined by customer	✓	✓	✓		✓					
Southwestern Bell Telephone Co. (Southwestern Bell Corp.)	Houston	Shell Oil Co., Tenneco, Inc.	Mid-1988	AT&T 5ESS	2B+D	5,000 each	To be determined by customer	To be determined by customer									
	St. Louis	AT&T	Third-quarter 1988	AT&T 5ESS	2B+D	2,000	To be determined by customer	To be determined by customer									

SOURCE: NETWORK WORLD

From previous page

"It makes the people trying to sell us something very cautious and technical."

Amidon, at the Arizona Department of Transportation, echoes Whittington: "We've been spoiled a little bit here. We've seen that the vendors really can respond."

#### Need to restructure

Because ISDN integrates both

voice and data, users and vendors will have to revamp their organizations to support the technology effectively, says Vogt of U.S. National Bank.

"ISDN not only facilitates changes internally in organizations, it will require new structures or interactions between Bell operating companies and their customers," Vogt says.

"When you put all these differ-

ent kinds of applications on one line, the old structures create barriers to problem resolution," he adds. "Think of it this way: Putting ISDN in is a lot like having a third party manage your data center. How many people have done that?"

"It's becoming more and more apparent to data professionals that the central office switch is going to play a big role in connectivity. So

this third party has a lot of responsibility," Vogt says.

Although widespread implementation of ISDN is still years away, these trial participants and initial commercial users are decidedly glad to be getting early hands-on experience with this new technology. All of them are convinced that ISDN's benefits are real, and that ISDN is the shape of the network of the future. □

## Special Section: ISDN

# Waiting for the gun

*ISDN technologies line up for the start.*

**BY JOHN DIX**  
Assistant Managing Editor

After years of preparation, Integrated Services Digital Networks are actually inching up to the starting line. But despite the fact that the race for advanced voice and data services is about to start, confusion abounds concerning the future availability of ISDN and its potential benefits.

"Most customers still have the mind-set that ISDN will appear in the 1990s," according to Richard L. Snowden, director of the Concept Development Center within AT&T's Business Markets Group. "Hell, we're out there loading switch software right now. ISDN is here."

AT&T, the principal domestic progenitor of ISDN, has been migrating its network to ISDN on a component basis for several years. These efforts will come to a head in the first quarter of next year when, Snowden says, AT&T will have finished upgrading its switches and will have nearly completed installation of the signaling system that will control the intelligent network.

Although there are probably 10 naysayers for every Snowden in the industry, the fact remains that AT&T, operator of the largest communications network in the country, is almost ready to present ISDN.

Of course, even when AT&T and other carriers



are capable of providing ISDN, the user community will not want to, nor be able to, displace embedded equipment to embrace the technology.

ISDN is not something that will be turned on overnight, like a switch cut-over. It is a technology that will grow with user acceptance. Customers will be largely responsible for building applications for ISDN technology, because

they best understand their own needs.

The implications of ISDN are great. The technology can make possible many things that were previously impractical or impossible and can pave the way for many as-yet-undiscovered networking applications. Companies that recognize the potential of ISDN early may be able to establish business advantages over competitors.

Planning is the key. For that reason, users must have a fundamental understanding of ISDN and how it will affect the future of network operations.

### ISDN explained

As a concept, ISDN is relatively straightforward: It is a standardized way to interface equipment and services to enable voice and data signals to be integrated over all-digital transmission and switching facilities, which can be controlled by end users (see Figure 1).

But the term ISDN is something of a misnomer. The concept does not presume that this country will see the development of one monolithic, integrated digital transport and switching system. The fragmented and competitive nature of the communications industry today has resulted in varying degrees of commitment and ability to commit to ISDN.

Moreover, while technologically possible, it is not economically feasible to build a single integrated network, given the billions of dollars worth of existing telephone network equipment already in place.

Even AT&T, which is probably further along in its ISDN effort than any other carrier, is implementing its so-called integrated digital network as a collection of independent special-purpose nets terminated at AT&T switching nodes.

With this nodal ISDN ar-  
Continued on next page

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chitecture, the only thing actually integrated is the link between customer and network. "ISDN really only addresses integration of access," Snowden says.

These multichannel integrated access links will do away with the need for separate voice and data trunks and special trunks for accessing specific services. The channels within the composite access links will be controlled by ISDN-compatible customer premises equipment working with carrier-based switching systems.

Two standard ISDN access-link configurations have been defined by the Consultative Committee on International Telephony and Telegraphy: the primary rate interface and the basic rate interface.

The primary rate interface is intended for use in business environments to support high-capacity devices such as private branch exchanges. It specifies how a single T-1 1.54M bit/sec digital communications link is divided into 24 individual 64K bit/sec channels. Of these, 23 are so-called "B" or bearer channels that can carry voice or data, and the 24th is a "D" data channel that carries signal messages controlling the B channels.

The basic rate interface is intended to support terminal and other equipment used by small businesses and residential users, as well as end-user devices in Centrex environments. The basic rate specifies how a single 144K bit/sec facility is segmented to provide two 64K bit/sec B channels and a 16K bit/sec D channel.

D channels provide out-of-band signaling, a separate signaling channel that carries the information required to establish and monitor voice and data calls over the B channels. In a non-ISDN environment, signaling data simply pre-

cedes voice and data calls within the same channel.

Besides signal messages, the D channels of both the primary and basic rate interfaces can accommodate packet data communications. Customers can use part of the D channel for packet-switched data or configure a full B channel to carry packet data.

AT&T and other long-haul carriers will initially support primary rate interfaces, while the divested Bell operating companies and other local exchange carriers are focus-

**Where higher speed data communications links are required, the D channel can be used to configure B channels in one fat data "pipe."**

ing on the basic rate interface in their trials (see "Early users mull merits of BOC trials," page 1).

The D channel is what distinguishes ISDN from today's telecommunications services. It serves as an electrical umbilical cord between intelligent customer premises equipment and intelligent carrier-based switching systems.

Using the D channel, customers will be able to control the use of B channels to support different applications on a call-by-call basis, one after another. One B channel

could be used to access WATS during part of the day, and later be reconfigured to support access to a special high-speed data service.

Where higher speed data communications links are required, the D channel can be used to configure B channels in one fat data "pipe." Six B channels, for example, can be used as a group to achieve a 384K bit/sec channel, a so-called H0 channel.

The full 1.54M bit/sec capacity of a primary rate interface can be achieved by using the D channel of a separate, parallel primary rate interface to provide signaling information. A single primary rate D channel can support signaling for as many as 40 parallel links.

This flexibility will enable customers to optimize their various network services by using a terminal or small computer to reconfigure access channels in response to changing network conditions. Eventually, intelligent premises controllers (a PBX or modified T-1 multiplexer) may be able to interact automatically with carrier networks on a real-time basis to determine the best use of the B channels within the integrated access link.

Besides controlling the access link, the out-of-band D channel is used to establish and control connections across the carrier network. In the case of AT&T, this is done by interfacing the D channel to AT&T's internal out-of-band signaling network, the Common Control Signaling (CCS) network.

The CCS network, which consists of 30 computers known as signal transfer points, is separate from and used to control AT&T's traffic-bearing networks.

AT&T is currently upgrading its 10-year-old CCS network, which is based on Signaling System 6, to support CCITT-specified ISDN Sig-

Continued on next page

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## CALENDAR

**July 6, Pittsburgh — Data Communications Testing Techniques and Products.** Also, July 7, Cleveland; July 8, Detroit; July 9, Columbus, Ohio; July 10, Indianapolis. Contact: Atlantic Research Corp., 5390 Cherokee Ave., Alexandria, Va. 22312.

**July 8-9, Chicago — ISDN: Understanding the Technical Requirements.** Contact: *Business Communications Review*, 950 York Road, Hinsdale, Ill. 60521.

**July 8-9, Washington, D.C. — Operator Service Opportunities.** Contact: TeleStrategies, Inc., 1355 Beverly Road, McLean, Va. 22101.

**July 13-15, San Francisco — The New Standards: OSI and ISDN.** Contact: Technology Transfer Institute, 741 Tenth St., Santa Monica, Calif. 90402.

**July 13-15, New York — Management Skills and Techniques for New and Prospective Managers.** Contact: School of Continuing Education, Seminar Center, New York University, 575 Madison Ave., New York, N.Y. 10022.

**July 13-17, Santa Clara, Calif. — Omnicom Week: Open Systems Interconnection.** Also, Aug. 17-21, Boston. Contact: The Omnicom Institute, 115 Park St. SE, Vienna, Va. 22180.

**July 14-17, San Francisco — Digital Image Processing.** Also, July 21-24, Washington, D.C.; Aug. 18-21, Anaheim, Calif. Contact: Integrated Computer Systems, 5800 Hannum Ave., Culver City, Calif. 90231.

**July 15-17, San Francisco — Network Wiring Techniques.** Contact: Datacomm Group, 55 Main St., Madison, N.J. 07940.

**July 16-17, Santa Clara, Calif. — 802 Local Area Network Standards and Technology.** Contact: The Omnicom Institute, 115 Park St. SE, Vienna, Va. 22180.

**July 17, Natick, Mass. — Managing People.** Also, July 23, Saddle Brook, N.J. Contact: Keye Productivity Center, P.O. Box 27-480, Kansas City, Mo. 64180.

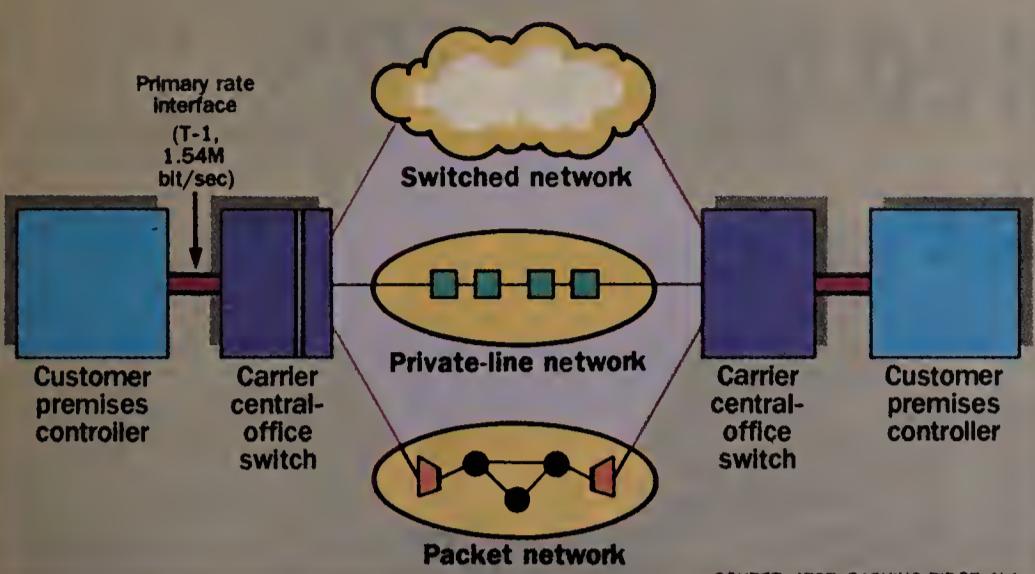
**July 20-21, Denver — Commercial Image Processing Markets '87: Present and Future.** Contact: Frost & Sullivan, Inc., 106 Fulton St., New York, N.Y. 10038.

**July 22-24, New York — Introduction to Data Communications and Networking.** Also, Aug. 3-5, Boston. Contact: Data-Tech Institute, Lakeview Plaza, P.O. Box 2429, Clifton, N.J. 07015.

**July 26-30, Minneapolis — ACUTA 16th Annual Conference.** Contact: Association of College & University Telecommunications Administrators, 211 Nebraska Hall, Lincoln, Neb. 68588.

## ISDN: A conceptual view

Figure 1



SOURCE: AT&amp;T, BASKING RIDGE, N.J.

From previous page

naling System 7 standards. This signaling method is used to establish paths through a carrier network and determine when devices are active. AT&T's new CCS network will be based on 14 signal-transfer points and will support 256-byte messages at 56K bit/sec, vs. 180-bit messages at 2,400 to 4.8K bit/sec supported with Signaling System 6.

AT&T is one of the few carriers, local or long-haul, with an operational CCS network. Snowden says he views this situation as a problem. "The local exchange carriers are appreciably behind us in development of ISDN," Snowden says. "They have yet to implement an out-of-band signaling capability,

going to be able to set up a switched 64K bit/sec connection between central offices on a pure ISDN basis until Signaling System 7 is available," according to Darrell Newberry, ISDN project manager for Pacific Northwest Bell. Local carriers that hope to offer ISDN-like services before they fully deploy CCS networks are exploring alternative ways to provide D channel support.

"One of the things we're looking at very closely in our field test is what kind of internetworking capabilities we can achieve without this technology," Newberry says.

US West, Inc. is conducting six ISDN field trials using X.75, a packet network gateway protocol. While X.75 provides a "broad range of capabilities," Newberry says, "there's no question we're going to have to have ubiquitous Signaling System 7 to get the full capability of ISDN." Pacific Northwest Bell is currently deploying the new signaling system, but it will initially be used to support other advanced services.

According to AT&T's Snowden, when ISDN becomes generally available, large business customers will likely maintain primary and basic rate interfaces to local exchange carriers and primary rate links to their long-haul carrier. Although the local carriers will normally provide the T-1 facilities to link customers to long-distance carriers, the circuits will not be switched, but rather only wired through the local exchange carrier's switch offices.

The premises controller at the customer site will be a PBX or a modified T-1 multiplexer, Snowden believes. This will support primary and basic rate interfaces, also referred to in ISDN parlance as "T" reference points.

There are "four reference point interfaces (R, S, T and U) defined along with broad groupings of functionality involving network terminations and terminals, both ISDN and non-ISDN," according to an AT&T technical paper on the subject (see Figure 2). These reference points define the network demarcation points between telephone company property and customer premises equipment and interfaces between customer premises equipment. The R interface connects non-ISDN equipment to

ISDN services; the other three interface reference points maintain the separation between the signaling and bearer channels.

### What good is it all?

Besides enabling customers to optimize their networks, ISDN paves the way for new applications. An interesting example of ISDN would be in telemarketing companies using automatic call distributors (ACD) to route incoming calls to waiting operators.

Using a specific customer as a model, AT&T found that ISDN could be used to spread traffic evenly over multiple ACD sites. The ACDs periodically relay information regarding their status to an

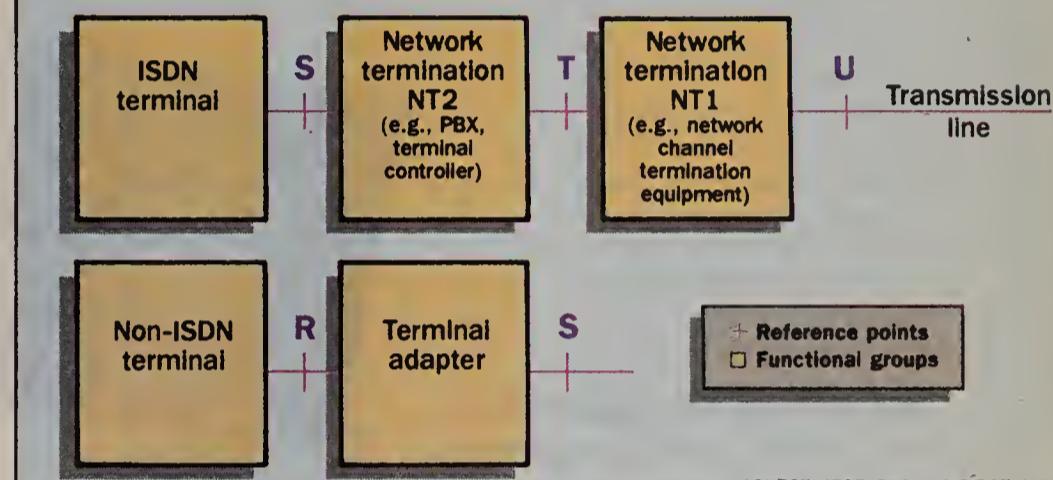
tions only scratch the surface. "We can't dream up all those applications ourselves," Snowden says. "We don't know that much about all those businesses out there. We will be working with customers to define applications."

Companies will migrate to ISDN piecemeal as they develop these applications. "Customers will use ISDN in applications," Snowden says. "They may also have applications that don't need ISDN. And because ISDN will be priced somewhat higher than plain old telephone service, they'll use PBX ports that don't have ISDN."

Aside from questions of availability, the other great ISDN unknown is the cost of its services.

## ISDN reference point interfaces

Figure 2



SOURCE: AT&amp;T, BASKING RIDGE, N.J.

800 service data base via D channel access links and AT&T's signaling network. Incoming 800 toll-free calls could then be routed based on time of day and point of origin as well as by ACD traffic load.

In the model examined, AT&T found that the time it took calls to be answered was reduced by 75% and the number of callers who hung up in frustration was reduced by an order of magnitude.

If call abandonment was not a problem, the same implementation would enable ISDN users to cut costs by reducing the number of operators required.

These AT&T-conceived applica-

The fundamental cost structure of primary rate ISDN links will be similar to today's T-1 rates, but the cost of data messages carried on the signaling systems has not been determined.

"Access costs are established already," Snowden says. "What will be different is the interface, the fact that you move messages across the signaling network. Resource costs are probably much higher than the implementation costs because you're using a lot of Signaling System 7 capability for customer-to-customer messaging." Snowden expects AT&T will file ISDN tariffs later this year.

**"One of the things we're looking at in our field test is what kind of internetworking we can achieve without this technology."**

and we really need that."

Out-of-band signaling is less important to the BOCs in the short term because they are focusing their attention on the basic rate interface and its use in Centrex business environments.

Although D-channel out-of-band signaling is still relevant to Centrex — enabling customer premises equipment to control use of B channels by interacting with central office switches — there is less need for the local carriers to implement AT&T-like CCS signaling networks because Centrex customers are typically supported from individual switches.

The BOCs will, however, have to build CCS networks to provide ISDN Centrex services for customers with sites supported by multiple Centrex switches. "You are not

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questions such as these: What are my network requirements? What applications belong on private resources controlled by my company? What applications am I willing to place in the hands of public networks? How much integration of voice and data applications is right for my organization? At what level, wide-area or local, is voice/data integration appropriate?

The answers to these questions vary, depending on a corporation's business agenda and management policies.

It is only in the context of carefully considered individual corporate requirements that managers should ask questions about vendor ISDN proficiency: How well does my vendor support standards? What is its migration plan toward new standards or technologies such as ISDN? How will proprietary components and private networks interwork with open system protocols and public resources?

Companies contemplating purchasing communications equipment, such as PBXs, should be especially confident that they understand ISDN's role in their organization. A PBX installed in 1988 under a six-year lease will still be expected to perform competitively in 1994, after ISDN has become a significant influence. Firms using longer lease or depreciation periods run an even greater risk of ISDN-induced obsolescence.

Effective communications planning architectures for the 1990s will specify corporate policies on many issues and technologies, including voice/data integration, standards, equipment procurement procedures and ISDN.

Whatever role a particular firm chooses for ISDN, that role will be an evolutionary step toward meeting the requirements of the corporate user base. Corporate networks in the 1990s will be dynamic and flexible but not necessarily completely reliant on ISDN.

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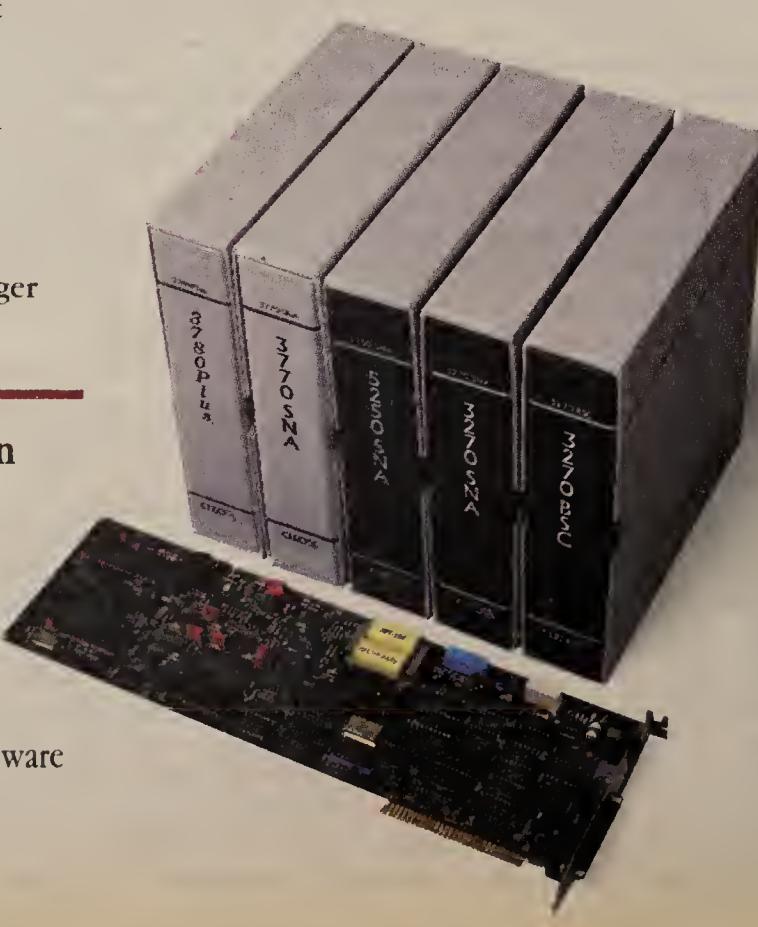
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# INDUSTRY UPDATE

## AT&T equipment revenue by segment

Revenues	1984	1985	1986	1987
Rentals	\$7,217.3	\$5,788.8	\$4,850.0	\$4,074.0
AT&T Technologies, Inc.	\$5,965.0	\$6,860.0	\$6,723.0	\$6,814.0
AT&T Information Systems	\$4,205.0	\$4,500.0	\$3,800.0	\$4,100.0
Total product sales	\$10,170.0	\$11,360.0	\$10,523.0	\$10,914.0

SOURCE: E.F. HUTTON &amp; CO., NEW YORK

## ► INTERNATIONAL TELECOM

# France attempts to smooth U.S. feathers

BY KARYL SCOTT

Washington, D.C. Correspondent

WASHINGTON, D.C. — French telecommunications officials recently played hosts and peacemakers to U.S. government and industry officials here, in an attempt to improve trade relations in the wake of the French government's decision not to award the sale of a French telecommunications manufacturer to AT&T.

Officials from the French Post, Telegraph and Telephone administration, Direction Generale des Telecommunications (DGT), and from the French telecommunications industry addressed a variety of trade and technology issues at a

seminar sponsored by France Telecom, Inc., the U.S. subsidiary of DGT.

DGT's Director General, Marcel Roulet, told the group that his country's decision to award the sale of the state-owned Cie Generale des Constructions Telephonique to Sweden's LM Ericsson in April was not politically motivated but based only on technical and commercial considerations.

AT&T lost the bid because the technology it would have implemented in France — the 5ESS central office switch — would have required a great deal of alteration to work in the French public network. This would have taken more

See page 11

## BRIEFS

**Corvus Systems, Inc.** signed an agreement valued at \$3 million, under which the company will sell workstations and network servers to **Control Data Corp.** for resale to CDC's customers.

William R. McCarthy, formerly vice-president of planning and business development at **Infinet, Inc.**, was appointed to the post of president and chief executive officer of **Tesdata Systems, Inc.** As previously announced, Tesdata has agreed to merge with Infinet.

**British Telecommunications plc** announced an 11.7% increase in pretax earnings for the fiscal year ending March 31, 1987. Earnings in fiscal 1987 were \$3.3 billion. Revenue for the fiscal year was \$15.2 billion, a 12.4% increase over the year earlier.

**US Sprint Communications Co.** recently appointed Earl E. Lawson executive vice-president of finance and MIS and Phillip C. Cooke senior vice-president of human re-

sources. Lawson previously served as vice-president and controller of **GTE Corp.**'s product and systems group. Cooke previously served as vice-president and senior human resources officer at **Citicorp**'s U.S. Card Product Group in New York.

**ComStream Corp.** of San Diego recently appointed Scott Smull vice-president of finance and Aaron Angle vice-president of operations. Smull previously served as corporate controller and finance and administration director at **Integrated Software Systems Corp.** Angle was vice-president of operations in charge of commercial high-volume communications products at **M/A-Com Linkabit, Inc.**

**Ansa Software Co.** and **3Com Corp.** recently announced an agreement to jointly market Ansa's multiuser data base, Paradox 2.0, with 3Com's 3System. In order to introduce Paradox 2.0, the companies will sponsor a 12-city seminar series for corporate users, developers and value-added resellers. □

## Infotron boosts bottom line

Infotron Systems Corp., which in its fourth quarter suffered a round of layoffs and an earnings loss, announced that its Infostream NX series of T-1 multiplexers has generated more revenue and unit shipments than any new product line in the company's history. Since the Infostream introduction in February, 32 unit sales have contributed \$1.5 million in sales, which should provide a welcome boost to Infotron's bottom line.

## ► MANAGEMENT

# User as vendor: A new viewpoint

*Job change changes perspective.*

BY PAM POWERS

Senior Editor

Next time you wonder about vendors and the wide gulf that separates your needs and their products, talk to someone like Norman Gentry, Richard Courtney or John Hart — they've worked on both sides of the business.

After looking at things from the vendor point of view, Gentry and Courtney came back to being users, but with a decidedly different approach to vendors. Hart remains with a vendor, but he hasn't forgotten his user roots.

"Every user wishes he could talk to vendor design engineers to create a product that answers his needs, and believe me, every design engineer wishes he knew what the user wants," said Gentry, communications manager for WSI Corp. in Medford, Mass. Gentry spent more than two years at Codex Corp. as an electrical engineer in group development of network management software.

Although he enjoyed his stint at Codex, Gentry said the position didn't suit him because of the large company bureaucracy and, more

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## INDUSTRY EYE

PAM POWERS

# Value-added network landscape still shifting

**T**he value-added network (VAN) vendors must feel a little beleaguered lately, what with all the unsolicited attention they've received from the Federal Communications Commission.

Things first took a bad turn when deregulation allowed the Bell operating companies to offer protocol conversion as part of their enhanced packet network services.

A second blow was dealt to the VANs, or so they felt, when the FCC more recently decided that enhanced services will continue to be classified as enhanced but need no longer be offered through a separate BOC subsidiary.

The VANs railed against those decisions, perceiving the BOCs as unfair competition. But over time, it has become clear that the BOCs will more likely couple their intra-local access and transport area services with the VANs' inter-LATA services.

That would be mutually beneficial to both parties: The BOCs could offer their users easy access to inter-LATA services, and the VANs would be able to provide better service

within the local loop.

Since only a negligible trickle of annual VAN revenue is contributed by users with intra-LATA data traffic, what they lose to the BOCs won't hurt them, the VAN providers contend.

But the possibility of FCC-imposed access charges recently proposed by the agency for VANs ("FCC plan would make VAN costs skyrocket," NW, June 15) poses a more serious threat.

If some of the calculated per-terminal-hour charges now being bandied about are correct — Telenet Communications Corp. estimates approximately \$4.50 — the vendors and users of public data networks (PDN) are in for a painful surprise.

It's pretty much axiomatic that Tymnet/McDonnell Douglas Network Systems Co. and Telenet will pass these costs on to the information services companies, who will in turn pass them on to users.

From what can be determined about the VANs' financial health in the absence of raw data, they operate with much-less-than-substantial

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## A new viewpoint

continued from page 9

importantly, the work required specialization, while he prefers the more generalized duties associated with a communications manager's job.

The user-vendor-user path taken by Gentry has given him a better understanding of the gulf separating the two camps. He said product designs often do not fit user needs because the engineers don't have direct access to users.

"When I was at Codex, engineers used to beat a path to my door asking what problems I had as a user and how I addressed them," Gentry said. "The engineers read books, but real life in the communications world doesn't fit those textbook accounts."

His vendor experience has proven invaluable, Gentry said, because he now knows who to call at a vendor company to get answers about how products work. He also knows how products will respond if installed in an unusual configuration.

Richard Courtney was the manager of data communications for Transamerica Corp. for four years before joining Racal-Milgo, Inc. in Sunrise, Fla., as product line manager for network management systems.

"Very few people in the vendor community have actually run a network on a day-to-day basis, which is quite different from designing a product on functional specifications based on what the vendor thinks the user wants," Courtney said.

Courtney, who was offered the Racal-Milgo position when he was president of the company's users group, said he empathizes with the vendor's difficulties. "Users have very little idea what an involved, complicated process it is getting a product out the door," he said.

Vendor/user relationships could be vastly improved if vendors hired communications managers for their staffs more often, Courtney suggested. "I can give Racal-Milgo a user's point of view on a daily basis," he said. "That's invaluable for both sides."

Courtney said that, in addition to his user perspective, his managerial skills and knowledge of the Racal-Milgo Communications Management Series (CMS) product line transferred well into his new position as a product line

manager.

John Hart, now director of the telecommunications marketing group at Digital Equipment Corp. in Maynard, Mass., brought a similar set of skills with him to DEC after his seven-year stint as Gould, Inc.'s director of corporate telecommunications.

Hart's migration from the user side to the vendor side was a carefully

planned one, he said, built around a conviction that he would best serve the industry and his career aspirations by knowing both sides of the business.

Hart said his experience at Gould was enjoyable because the company was forward-thinking and believed in using the network as a strategic asset. But his transition to the vendor side has given him "the

luxury of strategic and long-term planning," he said.

"I have gained the skills of a business manager, instead of a firefighter or problem manager," which is what Hart said he feels most users unfortunately are.

Hart said he enjoys being in less of a "react mode," and like Courtney, believes his knowledge of user

needs has aided him in his new role as marketing director. No matter where he ends up, Hart said his experience on both sides of the business is all part of a well-laid career plan that will provide him with a complete range of communications-industry skills.

"I knew from the beginning," he said, "I wanted to see this industry from every angle." □

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## France smooths

continued from page 9

time and financial resources than DGT was willing to invest, Roulet said.

Roulet went on to say he hoped the decision would not harm future trade relations with the U.S. "This was only one matter," he said. "We ask you to withhold judgment. Do not

judge our policy by one decision, but over time."

As the French telecommunications system is deregulated and state-owned telecommunications companies become privatized, there will be increasing opportunities for U.S. companies to participate in the French market, Roulet and other officials said.

While U.S. government and industry representa-

tives at the seminar declined to comment on the record about France's attempts to open its market to U.S. companies, off the record, several U.S. officials said France has done little more than give lip service to competition.

France took the first step toward deregulation of the state-owned telecommunications authority last year when legislation was

passed creating two separate telecommunications entities.

The DGT was designated as the telephone service company and the Commission Nationale de la Communication et des Libertes under the Ministry of Posts and Telecommunications was made responsible for regulatory matters.

"In France, we are evolving toward a separation of

the regulatory role and the operational role. The DGT will not be the arbiter of private sector entry," Roulet said.

Roulet said the DGT will remain the principal supplier of basic telecommunications services, "because this is a social responsibility, and we are not likely to alter this fundamental precept."

The relative size of the French telecommunications market also limits the scope of competition for local and long-distance service, said Marc Danelot, director of the Cabinet of the Ministry of Posts and Telecommunications.

"The DGT is approximately the size of one regional Bell holding company. The extent of competition is thus limited on practical grounds," he said. □

## Landscape shifting

continued from page 9

profit margins.

Constant upgrades to and expansion of the network, coupled with the cost of leased network capacity, make the business a very expensive one. There is simply no way that they can absorb access fees as well.

That means, of course, that the user will bear the brunt of the fees, which may result in a mass exodus from the PDNs. Then Tymnet and Telenet are left with a dwindling revenue stream and a smaller user base among which they must distribute the fixed cost of operating a PDN.

But the FCC contends that future subscriber line charge increases will swiftly diminish the cost of per-hour access for the VANs, as the burden of fees is shifted to the consumer and away from business.

In that case, the \$4.50 per hour Telenet has calculated would look more like \$2 or less, and the size of that charge looks potentially much less disastrous for VAN business.

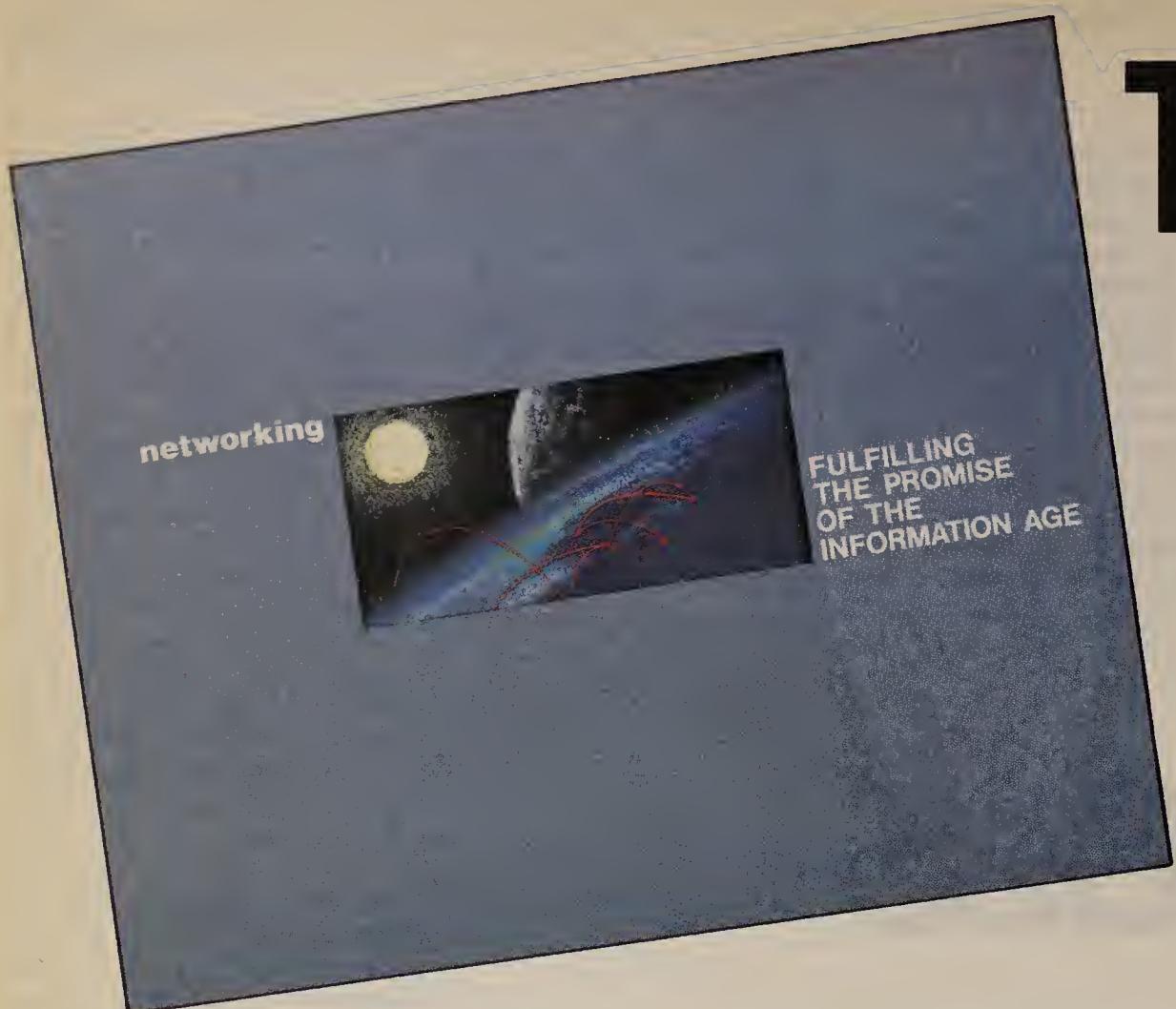
Since it's all still very much up in the air, it is difficult to make accurate predictions about whether the charge will even go through, let alone what impact it will have.

But one has to trust that the FCC is anxious to promote innovation in information services, and if a per-hour usage charge threatens the health of those services, something will probably be done to offset the damage. □

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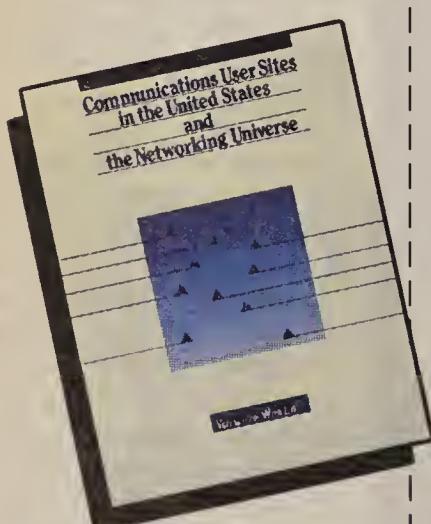
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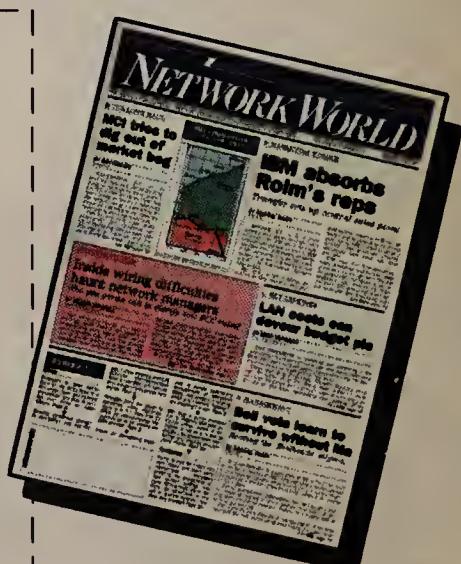
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# TELECOM TRENDS

## TEL Electronics signs with Best Western

TEL Electronics, Inc., a call accounting systems vendor based in American Fork, Utah, recently inked a two-year national account dealer agreement with Best Western International.

Under the arrangement, TEL Electronics will provide the lodging chain with 700 TEL Systems. These systems will be used with BestNet, Best Western's corporate communications network.

### SALES PACT

## Firm sells voice mail via Amway

*Amvox signs with Centigram Corp.*

BY BOB WALLACE

Senior Editor

SAN JOSE, Calif. — Amvox Corp. recently penned a three-year sales pact, valued at \$20 million, with voice-messaging systems vendor Centigram Corp. as part of a plan to offer automated telephone answering and voice-messaging services to medium-sized and small users in 35 cities by year's end.

Amvox, a business partner of Amway Corp., is a privately held company that installs and maintains Centigram VoiceMemo voice-messaging systems. Amvox will sell these voice-messaging services through Amway's network of 700,000 distributors. This marketing group rang up sales of Amway home and personal care goods totalling \$1.3 billion in 1986.

The IBM Personal Computer-based Centigram systems, which also incorporate Tellabs, Inc. trunking equipment, will be located in Amway offices close to Bell

operating company central offices with wide geographic coverage.

A caller trying to reach an Amvox voice-messaging office would dial a seven-digit direct inward dialing (DID) telephone number. The call would be routed through the central office switch and over a DID trunk to the Tellabs gear, which converts this trunk line into a two-wire ear and mouthpiece line. This line connects directly to the voice-messaging system.

Amvox said the services will first be made available in New York, Los Angeles/Orange County, Chicago, Dallas/Fort Worth and Miami. Amvox's voice-messaging services will be tailored to meet the needs of small businesses and branch office locations of larger corporations that wish to avoid the cost of purchasing a corporation-wide voice-messaging system.

A Centigram spokesman said this agreement represents the single largest sale in the company's 10-year history. The Centigram

Amvox deal is Amway's third telecommunications venture. Otto Stolz, Amway's executive vice-president, said the company has sold roughly \$120 million worth of long-distance communications services for MCI Communications Corp. since early 1986. Amway has also sold satellite equipment and programming through Starion Entertainment, a partially owned subsidiary company. Stolz said the firm's next foray will be into the cellular paging business.

Centigram predicted users will pay from \$12 to \$30 monthly for the offering, depending on the number of messages the voice mailbox is set up to handle and whether such features as call forwarding are used. Those with mailboxes on the system could call in and receive messages without operator assistance.

Three flavors of the voice-messaging service will be available. Amvox I can store up to eight messages at a time, each a minute long, for up to six days and carries a suggested retail monthly price of \$12.95. Amvox II can store as many as 16 two-minute messages for up to eight days and may cost \$19.95. Amvox III stores up to 32 two-minute messages for as long as 16 days and carries a recommended price of \$26.95. Amvox II and III feature a capability enabling users to forward messages. □

### TELECOM TIDBITS

Southern Bell Telephone and Telegraph Co. recently announced that AT&T Network Systems Group and Hayes Microcomputer Products, Inc. will use Integrated Services Digital Network services when Southern Bell cuts over its first commercial ISDN in March 1988 at its Dunwoody central office in Atlanta.

AT&T's Network System regional headquarters in North Atlanta will use approximately 400 to 450 2B+D basic rate lines, each providing the equivalent of two B, or bearer channels, for voice or data lines and a separate D signal channel.

Southern Bell will serve the location by installing a 5ESS central office switch module in office space leased from AT&T.

Southern Bell will provide Hayes Microcomputer Products with basic rate ISDN lines at its Norcross, Ga., facilities using T-1 carrier technology to span the distance from the Dunwoody central office.

Hayes will use the service for engineering development, electronic mail, personal computer-to-personal computer file transfer, order entry, voice communications and facsimile transmission.

Digital Sound Corp. of Santa Barbara, Calif., recently announced the signing of an OEM agreement valued at \$1.7 million with Ericsson Information Systems, Inc. of Richardson, Texas.

The agreement calls for Ericsson to market Digital Sound's Voice-Server System, a Unix-based system that is designed for general-purpose voice processing and storage.

The VoiceServer may be utilized for different purposes, including voice mail, voice response or audiotext.

Microvoice Corp. of Irvine, Calif., recently introduced an entry-level automated operator system that answers four calls simultaneously.

The four-port Apex can support up to 100 incoming private branch exchange trunks and provide user option menus to route calls to 512 different department, subdepartment or individual extensions.

The Apex system allows small business users to have 24-hour call processing with special messages at night, during the day or on weekends.

In addition, a microphone allows users to revise and update operator messages on site. The Apex automated operator system costs \$7,995. □

### CROSS TALK

JOHN DIX

## Private nets will survive ISDN

Private networks are often pitted conceptually against Integrated Services Digital Network environments, but they are not mutually exclusive.

Although ISDN presumes customers will come to rely on intelligence within carrier networks, users who prefer private networks will still be able to reap ISDN benefits by using customer premises equipment compatible with the standards.

It is possible, in fact, that private ISDN networks could evolve more quickly than commercially available ISDN carrier services. Hybrid networks — part public ISDN and part private network — could also provide an attractive option for some companies or a good migration path.

In concept, ISDN will enable customers to integrate multiple voice and data channels over the same carrier access trunk, and, once inside the carrier net-

work, fan out these channels and individually route them.

The composite access trunks will include voice and data B, or bearer, channels, which are controlled by a D signaling channel. The so-called out-of-band D signaling channel will enable customer premises equipment to configure the B channels on a call-by-call basis by interacting with carrier-based switches. A channel used to carry voice one minute could be reconfigured the next to carry data to a different location.

However, corporations can build private ISDN networks by using ISDN-compatible customer premises equipment linked with clear-channel T-1 1.54M bit/sec digital transmission facilities, the ISDN equivalent of an Electronic Tandem Network (ETN).

Private ISDN networks rely on the switching, routing and control intelligence of the customer premises equipment and

do not require interaction on an intelligent basis with the public network. A company could, for example, build a network using AT&T System 85 private branch exchanges that support the CCITT primary rate interface, which segments a clear channel T-1 facility into 23 B channels and one D channel. Networking the D channels of multiple T-1 pipes in this environment would provide the equivalent of a carrier-signaling network used to control network links.

Richard L. Snowden, director of the concept development center for AT&T's Business Markets Group, said the evolution of private ISDN networks will not hinder the development of commercial ISDN services. Snowden said AT&T would support private ISDN networks with the same enthusiasm it has given ETN networks. "I think we'll see a number of purely private ISDN nets," he said. □

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# DATA DELIVERY / NET MANAGEMENT

## ► INTERNATIONAL STANDARDS

### Management standard near

*OSI network management framework ahead of schedule.*

BY MARY PETROSKY

West Coast Correspondent

TOKYO — A framework for international network management standards recently moved a step closer to finalization when members of the International Standards Organization (ISO) group that defined the framework recommended it be approved as a draft international standard in a recent meeting here.

According to ISO rules, if the recommendation is accepted by the group's secretariat, the so-called Open

Systems Interconnect Management Framework will move from the draft proposal phase to the draft international standard (DIS) phase. DIS status is one step away from full acceptance of a standard, and this status signifies a standard's stability, according to several participants in the standards process.

The framework is a conceptual model that describes how the interconnection between so-called "open" systems should be managed, including a specification of which net man-

#### Open Systems Interconnect network management standards

OSI management framework	Development plan				
	1986	1987	1988	1989	1990
Common management information services and protocols	Draft proposal		Draft International standard	Draft International standard	
			International standard		
Specific management information services and protocols	Configuration management, fault management, security management	Draft proposal	Draft International standard	International standard	
	Performance management, accounting management		Draft proposal	Draft International standard	International standard
Management information base		Draft proposal	Draft International standard	International standard	
Directory services	Draft proposal	Draft International standard	International standard		

SOURCE: HEWLETT-PACKARD CO., PALO ALTO, CALIF.

agement services should be provided and which protocols will be used.

"We have spent seven years defining what has to be accomplished by OSI net management and how,"

said Trudy Reusser, a standards engineer in the Information Networks Group of Hewlett-Packard Co. and founder of the network management committee.

According to Reusser,

the decision to push the network management framework along to DIS status comes about five months ahead of predictions for this step in the

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#### DATA DIALOGUE BY PAUL KORZENIOWSKI

### IBM/NET pact poses puzzles

The recent joint marketing and development agreement reached by IBM and Network Equipment Technologies, Inc. (NET) was seen as a major boost for the Redwood City, Calif., firm, which has rocketed from start-up company to one of the leading names in the communications industry.

The deal gave IBM nonexclusive, worldwide marketing rights for NET's IDNX line of T-1 multiplexers. Both firms refused to reveal the length of the agreement, but at first blush, the agreement looks like a match made in heaven.

IBM benefits because it had a glaring hole in its product line without a T-1 multiplexer. Big Blue customers have been moving to vendors such as NET, Timeplex, Inc. and Digital Communications Associates, Inc. to fill the void.

As part of the agreement, IBM will also be able to add NET communications protocols to existing products and develop new products that closely link the two companies' offerings. IBM may apply this part of the agreement to upgrade its front-end processors. Customers report the IBM 3725 front-end processor does not have enough horsepower to work with a T-1 line and quickly becomes a network bottleneck. IBM and NET should be able to solve that problem. A second development area would be the integration of

the IDNX more closely with Rolm CBX private branch exchanges.

With the agreement, IBM not only gave its stamp of approval to the T-1 multiplexer market but also to the fledgling 3-year-old company. In a competitive market, that approval could mean the difference between survival and starvation. IBM has the marketing might to move a great number of NET's products.

The agreement could have an immediate impact in the international arena. NET has been busily increasing the size of its domestic sales force and has tapped few foreign markets. Ellen Hancock, IBM vice-president and president of the Communication Products Division, said IBM plans to enhance the IDNX so it can better support international T-1 lines and will soon begin selling the IDNX through IBM international sales arms.

Lurking beneath the surface benefits of the agreement are some potential shortcomings that would be felt more sharply by NET than IBM. IBM should move many IDNX multiplexers, but that does not mean NET will reap substantial profits. Big Blue has the marketing muscle to demand large discounts from its OEM suppliers, and this agreement probably isn't any exception. NET quickly gained profitability by maintaining a high margin on

See page 16

#### IBM INSIGHTS

**What's in a name anyway?** IBM has inadvertently created some confusion in naming one of its peer-to-peer networking capabilities. The confusion started when IBM published a document delineating a new communications scheme, dubbed Low Entry Networking (LEN), which enables devices such as a System/36 or a Series/1 to establish peer-to-peer sessions on a Systems Network Architecture network. Previously, SNA was hierarchical, and only a host could establish a session between two devices.

Devices in an SNA network fall into classes of so-called Physical Units, the most common being PU 2.0s. LEN works with IBM PU 2.1 devices, which are more intelligent than PU 2.0 devices. Thus, PU 2.1 has become synonymous with LEN. Clear enough, so far.

PU 2.1 devices can move messages only to a directly connected device. To free devices completely from networking host dependence, IBM added routing tables to certain PU 2.1 nodes, enabling them to route messages through a network. The added routing capability, which was announced only for the System/36, was labeled Advanced Peer-to-Peer Networking (APPN). At this point, things started to become a little murky.

Next, someone at IBM took a look at the PU acronym and decided it was not appropriate for Big Blue products. So, PU 2.1 devices were renamed to SNA Type 2.1 nodes. In conclusion, PU 2.1, LEN and SNA Type 2.1 are basically synonymous, and APPN builds on these capabilities.

Another item of confusion is which pieces of the new networking scheme are open. John Pickens, senior communications architect at Communications Solutions, Inc., a San Jose, Calif., consulting and software firm, noted that IBM has declared PU 2.1 an open architecture and published the specifications vendors need to develop PU 2.1-compatible products. However, the company has not made any statements or delineated any APPN specifications.

An IBM spokesman said the company is examining whether or not to declare APPN an open architecture. IBM appears to be a bit uncertain about how to proceed with APPN. Including true peer-to-peer networking capa-

See Insights page 16

“By placing PU 2.1 capabilities in its Network Control Program, IBM is reducing the dominance of the host in a Systems Network Architecture network. Total independence from host-based domains may not happen right away, but IBM has begun to make SNA a more attractive offering for truly distributed systems.

Atul K. Kapoor  
Vice-president  
Kaptronix, Inc.  
Haworth, N.J.

## IBM/NET pact poses puzzles

continued from page 15

its products and will likely be hard-pressed to match those margins under any IBM agreement.

Historically, joint marketing agreements have been fraught with difficulties. A few years ago, General DataComm Industries, Inc. signed an OEM agreement with Cohesive Networks, Inc. On paper, the agreement looked as attractive as the NET/IBM deal. However, neither company was ever really satisfied with the agreement, which was terminated when Digital Communications Associates, Inc. purchased Cohesive last year.

One problem with joint marketing deals is that the two participating parties are usually more concerned with their own well-being than with the success of the agreement. Big Blue's interest in the NET deal is illustrated by the fact that the company did not include NET's low-end multiplexers in the joint marketing agreement because

they compete with IBM products. NET's aspirations can be seen in the company's continued commitment to establishing an international sales and distribution arm, rather than granting IBM exclusive sales rights.

Distribution problems could arise under the current arrangement. NET customers are IBM customers, including such companies as American Airlines, Inc. and Wells Fargo & Co. These users may find two sales forces with the same products calling on them, a situation that can be a trifle confusing.

In addition, NET announced in February a joint marketing agreement with Doelz Networks, Inc., which may even lead to a situation where three sales forces are besieging a single user.

Most importantly, NET may have handed over customer account control to IBM. By wooing many of the nation's largest communications users, NET positioned itself for rapid growth in the next few years. These customers obviously will add other items to their

networks. With NET T-1 multiplexers in place, many would have purchased other types of communications equipment from the company.

Last summer, NET purchased ComDesign, Inc. and added low-speed multiplexers to its product line. Bruce Smith, president of NET, said the company was looking to acquire other companies to round out its product line, a strategy hailed by many industry analysts.

It will be interesting to see if that strategy changes. IBM has long seen NET customers as its own and wants to control them. When IDNX customers need additional communications products, will they look to IBM or NET?

An NET spokesman said the company's goal is to let the customer decide which vendor to select. If they opt for Big Blue, NET may have to rethink its long-term strategy and decide if it wants to become a primary source of communications equipment or play second fiddle to IBM. □

### Insights from page 15

bilities in a hierarchical network is a tricky technical achievement. The company has been reticent about APPN and appears to be taking the better-safe-than-sorry approach before making it widely available.

**Let's hear it for more competition.** "Telecom/Eye Bee Em," a newsletter from International Resource Development, Inc. in Norwalk, Conn., reported that Ameritech plans to battle IBM on the communications software front. Last year, Ameritech purchased Applied Data Research, Inc., a Princeton, N.J., software company.

The report stemmed from remarks made earlier this year by Robert Barnett, president of Ameritech Enterprise Group, to a group of users in Amsterdam. Barnett said that, in addition to its data base software, Ameritech plans to offer software that improves local-area network, microcomputer-to-mainframe and departmental system communications. □

## Management standard near

continued from page 15

standards process. Reusser said she knows of no instance where a working group's DIS recommendation was turned down.

The OSI management framework is likely to become a standard in 1988.

How the framework will actually be implemented in products is defined in four additional standards components, all of which are at different stages in the OSI approval process.

The purpose of the network management standards is to allow any vendor of network equipment to implement the standards and, by virtue of having done that, be able

to be a player in multivendor networking," Reusser said.

Standardization does not automatically mean vendors' products will work together, however. ISO does require that a standards proposal include conformance proposals before it is accepted as an international standard, according to Will Collins, principal engineer for Codex Corp. in Canton, Mass., and chairman of the ANSI XT35.4 committee on OSI management for the past three years. However, implementation of a standard is never specified.

The four components are known as common management information services (CMIS) and common management information protocol (CMIP); specific management information services; management

information base (MIB); and directory services.

CMIS is the vehicle for collecting information from and sending information to network nodes, according to Paul Brusil, group leader for network standards and performance at Mitre Corp. in Bedford, Mass.

CMIS has a set of service primitives for reporting and retrieving information, controlling the setting of parameters and initiating actions. CMIS will allow network managers to solicit network information, such as the value of a parameter, from a transport protocol layer, Brusil said.

And CMIS will provide the ability to transfer certain control commands, such as setting a retransmission timer or initiating a diagnostic test.

CMIS and CMIP are furthest along in the approval process. Both are currently in their second round as draft proposals, and these proposals were approved for balloting by ISO members at the Tokyo meeting, Reusser said. If approved, CMIS and CMIP will move on to the DIS stage, with full standard status likely in 1988.

CMIS and CMIP represent the protocols vendors need in order to implement the network management framework, Collins said.

In the event that the standards group is not able to draft an exhaustive set of services available in CMIS, it has left what Brusil called "placeholders" in the OSI management standards for specific management information services to be developed.

There are five categories of specific management information services, comprising configuration management, fault management, security management, performance management and accounting management.

Due to a lack of participants in the standards-making effort, the specific management information services are farthest from being

standardized, Collins said.

The third component of OSI management is the MIB. MIB "describes all the information that's needed in order to make management decisions," Brusil said.

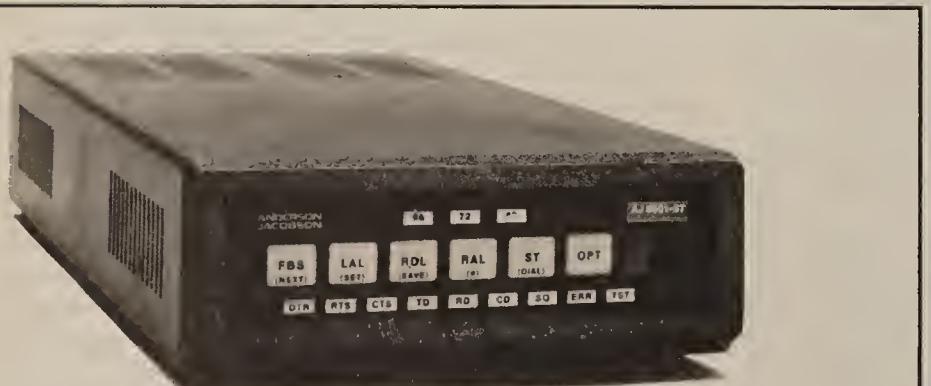
Some of this information resides within protocols and is transient, such as when a protocol layer counts the packets it is sending and the number of connections it has. Other information may be in historical archives of performance and accounting data, Brusil said.

Although ISO does not specify whether the MIB is centralized or decentralized, "in reality, it will be a totally distributed system," Brusil said. The MIB proposed standards are expected to enter the DIS stage sometime next year.

### Directory services

The fourth component of OSI management is directory services. These services are designed to manage naming information and the distribution of name-related information, such as the associations between logical names that network users might employ and actual networking addresses, Brusil said. Protocol layers and the range of network nodes — such as gateways, host computers and terminal servers — all have addresses.

In addition to being an ISO standard, directory services also falls under the purview of the Consultative Committee on International Telephony and Telegraphy, according to Hoyt L. Kesterson II, a consulting staff engineer for Honeywell, Inc., Bull Peripherals Corp., Phoenix Computer Products, Corp. and rapporteur for the directory services work group. As a result of that CCITT involvement, the directory services group is under pressure to produce a standard in time for the CCITT plenary session in 1988. Already in the works as a second draft proposal, directory services could reach the DIS stage by the end of this year, Kesterson said. □



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# LOCAL NETWORKING

## LOW-END NETS

# Users tepid on data switch

Early NetCommander users cite pros and cons of product.

BY PAULA MUSICH

Senior Editor

Software AG of North America, Inc. and Citicorp, two early users of Digital Products, Inc.'s NetCommander data switch, give the product mixed reviews for meeting their printer and modem-sharing needs.

Both firms chose the Watertown, Mass.-based company's low-cost data switch over other networking alternatives because they needed an inexpensive way to

share costly laser printers. Citicorp also selected NetCommander for its modem-sharing capabilities.

Data switches like NetCommander employ circuit-switching technology to move data over RS-232 or unshielded twisted-pair wire in a point-to-point manner at speeds up to 19.2K bit/sec. Because they cost less and are less sophisticated than other networking methods, they are used most often for simple device sharing and limited file transfer.

NetCommander provides periph-

“I think there are some people who believe TCP/IP is strictly a CAD/CAM, government or university solution. I think TCP/IP provides commercial end users with the capability of connecting a lot of different types of machines. If you've got DG, Prime, DEC, IBM [equipment] and a bunch of personal computers and you want to connect them all together, TCP/IP today is the only thing that will allow that to happen. I think it's a viable commercial alternative.

Michael Pliner

Chairman and chief executive officer  
Sytek, Inc.

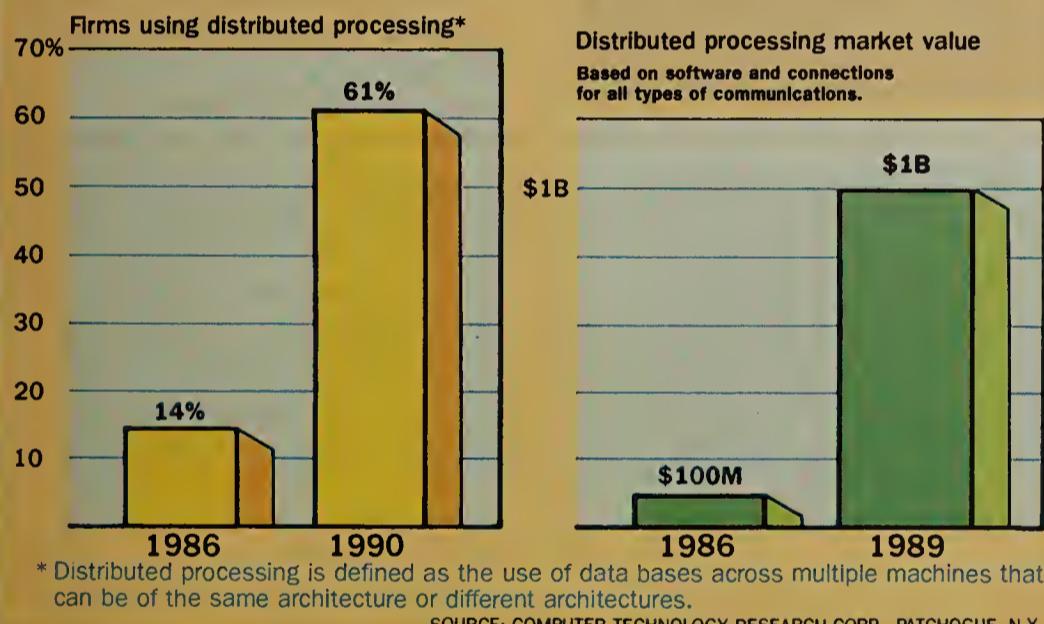
Software AG is using 25 NetCommander units primarily for printer sharing and some file-transfer functions at 22 locations around the country. Seligson estimated that 225 personal computer users are sharing 40 laser printers.

Because Citicorp Industrial Credit's Leveraged Financing Department wanted shared access to a central electronic mail system, modem sharing was an important feature. "Modem sharing was the determining factor for us, although cost did come into play as well," said Al Gersbeck, senior systems officer at the Harrison, N.Y.-based financial services firm.

Citicorp users at nine different locations throughout the U.S. are using 35 NetCommander switches for sharing modems and printers.

See page 18

## Distributed processing in Fortune 500 firms



## NETWORK NOTES

Codenoll Technology Corp. of Yonkers, N.Y., and Standard Microsystems Corp. recently introduced a product that allows Attached Resource Computer Networks (ARCNET) to be implemented on fiber-optic cable at a cost said to be slightly higher than that of copper cable.

Codenet Fiber Optic ARCNET is a single card that plugs into an IBM Personal Computer or compatible and attaches directly to the fiber-optic cable. ARCNET is a baseband, token-passing local network technology that operates at 2.5M bit/sec. The fiber-optic network costs about \$700 per connection.

The Wollongong Group of Palo Alto, Calif., improved the performance of its Digital Equipment Corp.-compatible networking software and added several enhancements, including support for inter-

networking, subnet routing and Exterior Gateway Protocols for 12 different physical interfaces.

Release 3.0, which works on all DEC/VMS processors, adds support for primary and secondary domain name servers and an improved WIN/TCP mail system. The system supports distribution lists, use of nicknames and domain addressing.

Server Technology, Inc. of Sunnyvale, Calif., recently acquired data switch vendor Crosspoint Systems of Eugene, Ore. No value was placed on the acquisition.

Server Technology will bundle the Crosspoint line of data switches with its Easyprint software for a new family of products that allow IBM Personal Computers and compatibles or Personal System/2-class machines to share peripherals. Crosspoint will be a division of Server Technology.

## LANMARKS

ERIC KILLORIN

# The Dark Ages vs. plug-and-play

The communications industry is progressive in many ways, but it's in the Dark Ages when it comes to standards.

If the home audio equipment market were like the local-area networking business, music lovers wouldn't be able to attach components from different manufacturers to achieve the sound they wanted. The electrical service supplied by utility companies would vary from house to house, making the plug-and-play world we enjoy today an impossibility. And imagine a favorite radio station operating at a different frequency with each radio manufacturer's equipment.

This nightmarish scenario is the reality of local network planners throughout the user community; their attempt to attach computers from different vendors is often solved with bulky protocol converters, costly gateways, the overhead of host intervention and endless lines of code needed to convert dissimilar file structures.

What's to be done? While there are several standards organizations working to achieve systems interoperability, the

Killorin is the publisher of "Netline," an industry newsletter on computer networks, a publication of Hyatt Research Corp. in Andover, Mass.

Corporation for Open Systems (COS) has become one of the most visible. COS' objective is to accelerate the adoption of Open Systems Interconnect (OSI)-compliant protocols. Although many have given COS only lip service — just as with the International Standards Organization itself — COS is gaining momentum on the strength of more than 60 members.

These members have generated funding for testing and certification and have developed an aggressive campaign to show that ignorance of OSI isn't bliss. COS is an independent organization, and therein lies the strength of its checks and balances system; neither user nor vendor objectives are unduly catered to.

COS has worked with all seven layers of OSI and has established "platforms" on which various protocol specifications are grouped. There are low-priority and high-priority protocol suites within these platforms, and priorities are based on which protocols can solve the most problems and have the greatest support.

There are numerous specifications being considered for adoption in each layer, which in combination result in a protocol "stack." A protocol stack

See page 18

## The Dark Ages vs. plug-and-play

continued from page 17

is a selection of interoperable layer specifications that provide end-to-end connectivity across the OSI model's spectrum.

A fully functioning layered architecture should have enough independence in the protocol stack to ensure compatibility with other architectures that use alternative interfaces. This is how multivendor communications will be achieved, since each vendor will adopt the protocol stacks most appropriate for its customers.

An interesting development in the upper layers of the platform concerns the Message Handling

System (MHS) protocols. MHS has widespread acceptance in Europe and is receiving attention here. It is a store-and-forward protocol for local network environments, allowing several interconnected computer systems to transfer messages among their users. The series of X.400 electronic mail specifications from the Consultative Committee on International Telephony and Telegraphy have been recommended for adoption as MHS-compliant protocols.

In promoting this electronic messaging standard, COS is faced with the momentum of the large installed base of non-OSI systems such as IBM's Systems Network Architecture and Digital Equipment Corp.'s Digital Network Ar-

chitecture (although DEC is moving much more rapidly away from DNA toward OSI compliance).

Other obstacles for COS are the inherent complexities of developing standards at each layer and the three- to five-year time frame associated with such a task. New local network schemes are also hitting the market regularly, and COS must be able to react.

Even after standards are established, the vendors' implementations must be policed to ensure compliance. In this vein, COS' work is not unlike the work that must be done in the U.S./Soviet talks for regulated nuclear arms; the two sides must obtain not only agreement but accountability and enforcement as well. □

## Users tepid on data switch

continued from page 17

Each location, equipped with a 16-port NetCommander, supports 12 personal computers, two printers and two modems.

Although printer sharing worked fine for both firms, modem sharing for the users at the Citicorp subsidiary fell flat. "Modem sharing is a problem," said Gersbeck. "It's very inconsistent. Sometimes the NetCommanders work; sometimes they don't. We haven't had any problems at our Cleveland office, but we've had all kinds of problems in L.A., and we haven't been able to figure out why."

The department has had to replace 15 of the switches to date. Because the switches failed under warranty, however, the replacements haven't cost Citicorp money — only time and a few headaches, according to Gersbeck.

The switches that had to be replaced would suddenly lose their configuration information for no apparent reason, Gersbeck said. "We'd reconfigure the switches, and two days later, the same problem would reoccur," he said. Configuration information is downloaded from attached personal

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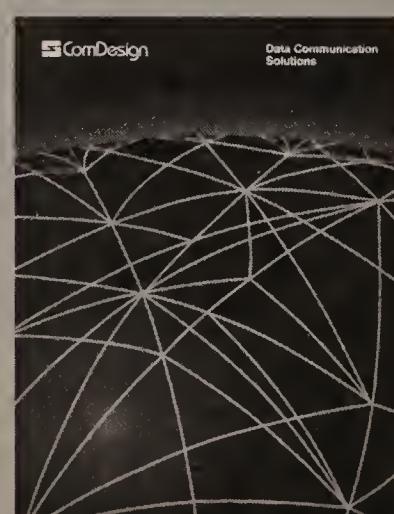
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Although printer sharing worked fine for both firms, modem sharing for the users at the Citicorp subsidiary fell flat. "Modem sharing is a problem," said Gersbeck. "It's very inconsistent. Sometimes the NetCommanders work; sometimes they don't. We can't figure out why."

computers into buffers in the switch.

Gersbeck also said that, occasionally, some of the switches would fail to disconnect a completed session, locking out access to a shared modem and ringing up access charges for the Telenet Communications Corp. network Citicorp uses for transmitting data.

Software AG has met with success using the switches for its applications, although the mainframe software vendor doesn't use the switches for communicating between its offices. "We already had a mainframe network with its own electronic mail program," said Seligson. "PCs were already connected to the mainframe."

Citicorp plans to install a new Micom Systems, Inc. switch that will perform the communications functions provided by the NetCommander.

Citicorp will continue to use its existing NetCommanders for printer sharing, but it won't buy any additional switches for that function.

Gersbeck said the combination of decreasing prices for laser printers and the cabling costs associated with installing the data switch have wiped out the cost advantage, making it more cost-effective to buy a printer for each user. □

# COMMUNICATIONS MANAGER

“The three information management functions — office automation, data processing and telecommunications — are being merged, with functional responsibility generally under the head of MIS. However, use of the title chief information officer is increasing.

**Excerpt from a survey of 130 major U.S. companies**

Arthur D. Little, Inc.  
Cambridge, Mass.

## ► INTERVIEW

# GSA's Kreklow on management role

*Managers evolving to executive level.*

BY MICHAEL FAHEY

Senior Writer

SEATTLE — In his 30 years working in telecommunications, Rebel Kreklow has seen the role of the communications manager evolve from tool-carrying technician to executive-level administrator.

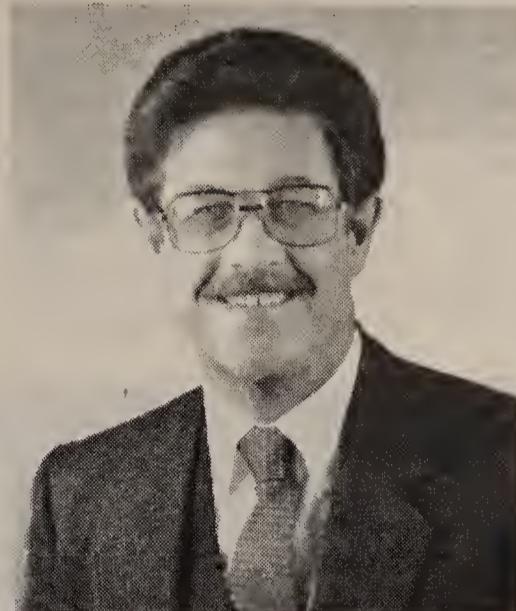
“The image of the communications manager is changing. We are being recognized as business managers,” said Kreklow, who is chief of telecommunications for the U.S. General Services Administration’s four-state Pacific Zone North.

But communications managers have to improve upper management’s perception of their role fur-

ther, Kreklow said. “We have to be better trained in terms of financial management, decision-making and personnel issues.”

Kreklow and his 25-person staff provide telecommunications services for nearly all of the federal agencies in Alaska, Washington, Idaho and Oregon. They are responsible for 28 telephone systems serving some 1,600 federal offices throughout the four-state area.

Kreklow said communications managers must be better informed about their organization’s business goals. “In order to serve our companies and agencies better, we must understand the organization’s purpose and how it functions,” he said. “It is incumbent on



Rebel Kreklow

the communications manager to show upper management what can be done with communications to further the goals of the organization. But we can’t do this without being familiar with its structure and purpose.”

To accomplish this, Kreklow meets regularly with the administrators and users from the federal

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## ► MEMBERSHIP DRIVE

# COS signs DOD group and Nynex

*DCA, BOC become senior members.*

BY KARYL SCOTT

Washington, D.C. Correspondent

MCLEAN, Va. — The Corporation for Open Systems (COS) said last week the Defense Communications Agency (DCA) and Nynex Corp. have joined COS as senior research members, making them the first federal agency and Bell operating company, respectively, to sign on with the communications consortium.

Adding one of the largest government users and a major communications carrier to the senior ranks of COS is a coup for the 1-year-old standards-testing organization and represents the fruition of months of negotiations.

COS is a nonprofit research and development consortium comprising 67 communications users and vendors. COS’ mission is to identify, implement and test Open Systems Interconnect (OSI) protocol standards and drive the development of OSI-based products.

The Office of Management and Budget (OMB), which is responsible for the development of a governmentwide OSI implementation policy, last week endorsed DCA membership in COS. According to OMB, DCA will represent all users within the defense community at COS.

OMB also directed the National Bureau of Standards (NBS) of the Department of Commerce last week to join COS on behalf of all civilian agencies. NBS has not as yet joined.

As senior members, both DCA and Nynex will pay an annual membership fee of \$200,000. Senior membership status gives members the greatest participation in various COS activities and the greatest influence over policy development.

As senior members, DCA and Nynex will be allowed to have representatives on five technical subcommittees, participate in the Strategy Forum — the policy setting arm of COS — and have direct input to the board of directors, said Ted Manakas, COS information products manager in charge of recruitment.

Senior membership status is the  
See page 21

## GUIDELINES

JIM MORGAN

# Debugging systems’ people problems

Too often, people attribute communications system failures to technical failures, when they are actually the result of people problems.

Problems incurred at the cut-over of a new telecommunications system, for example, may be blamed on faulty programming or intermittent hardware failures. But the real cause of the problem may be due to cutting corners on user and maintenance staff training; that is, people problems.

In another example, a private branch exchange or local network that experiences excessive downtime due to component failure may be out of service longer than necessary because the telecommunications staff was never taught how to swap out failed components. Or the problem might stem from a lack of spare parts due to management penny-pinching. Or the vendor’s maintenance staff might have arrived with the wrong test equipment. All these are people problems.

Morgan is head of J.H. Morgan Consultants, a Morristown, N.J., company that provides telecommunications management and technical consulting.

This phenomenon exists because it is often easier to blame equipment for communications problems than to blame people. Upper management is more receptive to equipment problems than to people problems. But the problems will continue until com-

Problems incurred at the cut-over of a new telecommunications system, for example, may be blamed on faulty programming or hardware failures. But the real cause may be due to cutting corners on user and maintenance staff training; that is, people problems.

petent managers see a pattern and identify the real problems.

Technically competent people unfortunately tend to look for technical solutions to problems because that is their area of expertise. They force-fit solutions using the technical knowledge with which they are comfortable. Too many wear technical blinders.

In today’s fast-changing com-

munications environment, we must take a broad-based problem-solving approach, considering both people and technology as potential culprits when breakdowns happen. Of course, true technical problems do occur. Components fail; design limits are exceeded; intermittent faults happen; software bugs occur, and weak designs are produced. Telecom people must indeed maintain their technical expertise. But their efficiency suffers when they constantly resort to a narrow technical approach to solving problems.

How can communications managers expand their troubleshooting to include people-related problems? Where will they get the time for understanding their users? The answer is that they have more time to solve the truly technical problems once they recognize the people problems.

In order to sensitize themselves to the issues that lead to human rather than technical problems, communications managers must make an up-front time investment. The effort is worth it. The payoff in correctly diagnosing people problems comes in increased time to devote to true technical problems. □

## DIALOGUE

Have the product announcements IBM has made in the last year made its communications strategy any clearer?

"I don't think they have clarified IBM's strategy very much. It seems that half of their products aren't available, and the ones that are available aren't necessarily fully developed.

I just hope they have a clear picture of what they are going to do. I do suppose it's a little clearer than it was in the past, but it seems they have so many things out there now, it's difficult to make a proper choice. We're an IBM shop, so there's hope that we could utilize some of the products, but it is difficult to decide which ones.

**Robin Fromm**

Communications specialist  
Detroit Ball Bearing Co. of Michigan  
Detroit

"I think the product announcements they've come out with in the past three or four weeks have sounded very good, and they're definitely making the competition and users think twice about buying the equipment. We just went ahead and bought a lot of DEC equipment, but people I've talked with say that down the road they will move back to IBM equipment.

**John Winn**

Communications analyst  
Electronic Data Systems Corp.  
Southfield, Mich.

"IBM's strategy is far from clearer. It's muddled, especially when it comes to SNA, which used to be a very well-defined host-to-peer network. Now you have host-to-peer and peer-to-peer; it's not clearly defined. The equipment announcements are benign, in my opinion, because other manufacturers have already been there.

There isn't really anything innovative or new. There has been some integration of IBM and non-IBM equipment. However, in that integration, they are also forcing you to use the newer technology.

**Walter Southwell**

Telecom analyst/hardware specialist  
Farm Credit Banks  
Irmo, S.C.

"Our company was very pleased to receive the announcements, especially the ones on NetView and Rolmbridge. From the input I've gotten from other people in communications at Fidelity, they are very excited and they are passing along all the information to the various departments because they know it's going to have an impact on us.

**Carmelo Pagan**

Communications analyst  
Fidelity Investments  
New York

"There wasn't anything superimpressive. We weren't impressed with any strategic direction changes, but I think it has a lot to do with what was interesting to us also. We're excited to see IBM relaxing their proprietary standards

"I don't think it's made their strategy any clearer. It is still muddled. I think they are, indeed, trying to conform more to what the rest of the industry is doing, but their particular position at this point is not as clear as it could be. I believe they are headed toward more connectivity with other vendors. But, I'm not sure how they are going to do that.

**Richard Lilly**

Data communications manager  
Interstate Electronics Corp.  
Anaheim, Calif.

"I think it made it clear that IBM is putting a lot more emphasis on communications. They announce products and then don't make them available until Novem-

ber. I'm always skeptical about their announcements, because it seems they preannounce things. They announce [Systems Application Architecture] and it's not going to be available for months and months and then a year.

**Jerry Moloney**

Senior communications analyst  
John Hancock Mutual Life Insurance Co.  
Boston

"I go back a long way with IBM, and I am not skeptical. They are pretty reliable. Until they make a total commitment to SNA, I'm not sure where they're going to go.

**David Gray**

Data communications specialist  
International Revenue Service  
Detroit

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## GSA's Kreklow on management

continued from page 19

agencies for whom his department provides telecommunications services.

"We have periodic visits with the agency heads and their telecommunications coordinators," he said. "We have users groups in Anchorage, Boise, Portland, Seattle and Spokane, and we meet with them quarterly."

Kreklow said that although he works for the federal government, he is confronted with the same constraints and opportunities as his colleagues working in the private sector.

The rapid changes in communica-

cations technology and the uncertainties wrought by divestiture have complicated the duties of all communications managers, said Kreklow, who began his career with the federal government as a teletype operator.

"There are more options, and the decisions are becoming more difficult. Things like the cost of money and depreciation schedules are becoming as important as technical issues," he said.

Furthermore, Kreklow said, as communications managers take a more active role in their organizations' overall management, writing and public speaking skills become essential.

"Sometimes the so-called expert is just the person with the best

slide presentation," Kreklow said.

Because the role of the communications manager is changing, Kreklow said, people entering the profession are likely to be products of college- and graduate-level communications management programs. "We are starting to see people with degrees," he said. "Two of my area managers have associate's degrees in telecommunications, and I think it has helped them in their work."

Kreklow, whose first experience with communications came when he enlisted in the Air Force following high school, has taken many courses at local colleges and universities, and he is hoping to earn a bachelor's degree in telecommunications. □

## COS signs DOD group and Nynex

continued from page 19

highest level of participation in COS.

DCA participation in COS' OSI testing work is especially crucial in light of COS' recent drive to attract more user members. The addition of DCA brings the number of users in COS to 18.

"Users are a priority group for COS due to their valuable practical input to our mission," said COS President Lincoln Faurer. "Their experience enhances the research we conduct and adds the perspective of market viability," Faurer said.

DCA officials declined to comment on their specific reasons for joining COS. However, DCA spokesman Major H.R. Hock did say, "DCA hopes to work closely with vendors and other users on the adoption and implementation of OSI and other communications standards."

One of DCA's top priorities is expected to be the implementation of OSI network security standards. "We expect DCA to contribute their expertise in this area and drive the development of security standards that will benefit government as well as private sector users," Manakas said.

Nynex's decision to join COS was approved by its board of directors last week, signaling what could be a trend of RBHC participation in the communications consortium.

Officials at COS have been trying to enlist RBHC membership for some time.

"We felt the time was right to join," said Nynex spokesman Joseph Gagan. "It's an important organization that will be influential in the development of key computer and communications standards in the years to come," he said.

Bell Atlantic Corp. officials, who recently attended a COS strategy forum, agreed with Nynex's sentiments, but decided not to join COS at this time.

"We strongly support the work of COS and feel it is very close to what we are doing in the open systems arena, but we don't have the financial or human resources to commit to COS," said Roger Nucho, district manager for standards and technical requirements at Bell Atlantic.

Nucho did not rule out the possibility of joining COS at some later date. Another major user considering membership is American Express Co., which is weighing the cost/benefit question. "We're very interested in technology such as OSI that will help us move into the future and help us sell our products," said Eileen Bell, manager of International Transaction Services. "We just have to decide whether we can afford the \$25,000 user membership fee."

The DCA's \$200,000 senior membership gives the agency a greater degree of participation and control over policy than the membership type that American is considering. □

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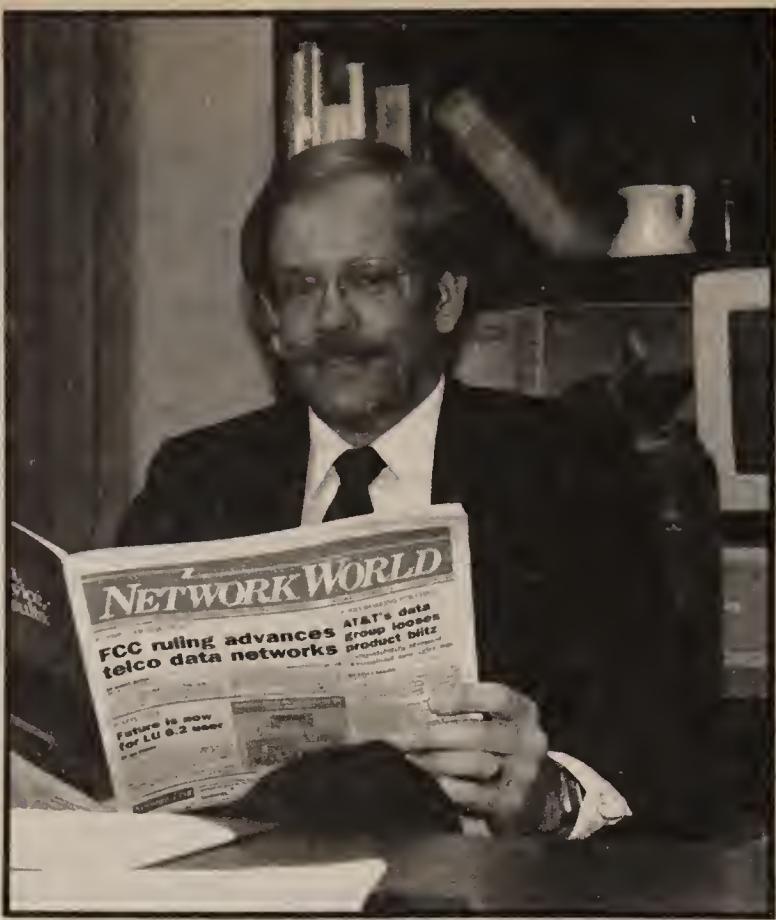
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“...I’m looking for vendors who take a systems approach to networking.

## And I find them in *Network World...*”

**R**obert Stark is Manager of Network Operations for Litton Industries of Beverly Hills, California. He supervises the company's voice network analysts as well as those analysts who provide telecommunications consulting services to Litton divisions.

In this position, he is also charged with establishing specifications and making recommendations for the purchase of network communications equipment. And in order to carry out these responsibilities, Robert turns to *Network World*.

“Reading *Network World* definitely helps me in my job. I get crucial information about the viability of certain vendors, which lets me know if I should enter a business relationship with long-term expectations. In my job I’m looking for vendors who take a systems approach to networking. And I find them in *Network World*, which covers networking from a systems point of view.

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# NEW PRODUCTS AND SERVICES

See inside for:

- OAZ PC-to-facsimile add-on board
- Fox twisted-pair LAN
- PCC's PROFSlink package

## ► NATIONAL COMPUTER CONFERENCE

### DSC, GTE gear debuts at NCC

*Product unveilings brighten slow show.*

BY JOSH GONZE

Staff Writer

CHICAGO — A few networking gems announced at the National Computer Conference (NCC) here recently helped brighten the pall cast by poor attendance at this year's downsized edition of the once-towering computer show.

Two subsidiaries of central-office switch maker DSC Communications Corp. announced products the company hopes will help it advance into the private network market. DSC Nestar Systems, Inc., the company's local net subsidiary, unveiled a set of token-ring and ARCnet products at a press conference. Concurrently, Granger Associates, Inc., a subsidiary that makes telecommunications gear, announced an enhanced T-1 multiplexer called the CP2000 Digital Network Access System.

The Nestar local-area network

products include three new servers, an intelligent network interface card (INIC) with a built-in coprocessor and an X.25 gateway that lets up to 32 workstations concurrently access public data networks.

Two of the new file servers, the Planstar Models 1 and 2, will eventually replace Nestar's older desktop file server, Plan 3000. The Model 1, priced at \$6,700, offers an 80M-byte disk drive and a 60M-byte tape drive, while the Model 2, which costs \$9,600, offers 150M bytes of each. Both will be available in September. Nestar continues to offer a high-capacity file server called the Plan 5000.

A new asynchronous communications server, the Planstar ACS, is compatible with ARCnet and IBM Token-Ring networks, manages up to 16 modems and handles speeds up to 19.2K bit/sec. It is available immediately in eight- or 16-port

versions. The eight-port version is priced at \$6,000.

The INIC network interface board is IBM Token-Ring Network-compatible and enables IBM Personal Computer XT and ATs to access a Nestar file server. The on-board coprocessor frees the computer's power for other uses and speeds up processing. It is priced at \$595 and will be available in September.

Enhancements to the Granger CP2000 Digital Network Access System multiplexer included increasing the number of T-1 interfaces from six to 20 and the number of DS0 channels from 72 to 240. The expansion was made possible by increasing the number of option card slots from eight to 12 and adding a slave shelf with room for 16 more option cards. Granger also made common equipment redundant to make the whole box largely fault-tolerant, according to division manager Donald Skipwith. Common equipment includes the power supply, system processors and cross-control matrices.

In one of the few other communications announcements, GTE Spacenet Corp. debuted a network management system and a point-to-point data service designed to strengthen its Skystar family of very small aperture terminal satellite communications services.

Skystar's new net management system is based on gear GTE Spacenet calls universal protocol cards, which monitor individual communications circuits and allow reconfiguration of remote terminal equipment. The cards support asynchronous and synchronous protocols and a variety of interfaces approved by the Electronic Industries Association and the Consultative Committee on International Telephony and Telegraphy. Configuration control takes place at the user's site and allows permanent, switched or application-assigned routing for optimization of transmission paths, according to the company.

The McLean, Va.-based company previously offered a more limited monitor and control capability with the Skystar service.

The new system does report-generation, providing data on performance of stations, lines and protocol cards. Statistics are arranged hourly, daily and monthly. An audit file of all network events is stored. The system is Unix-based and, according to GTE Spacenet, can interface with Unix-based local-area networks.

The new point-to-point service, which costs \$1,700 per month, uses the same Ku-band frequencies and provides the same 56K bit/sec transmission speed as the company's multipoint service. □

## ► PC EMULATION

### Quicklink networks ASCII CRTs

BY JIM BROWN

New Products Editor

COSTA MESA, Calif. — The Network Link recently introduced an IBM Personal Computer-compatible board that enables a connected ASCII terminal to act like a network-connected personal computer.

QuickLink plugs into the host personal computer's expansion slot and supports an ASCII terminal over twisted-pair wire, RS-232 or RS-422 cable. The terminal can then be used with a personal computer keyboard to run MS-DOS applications. QuickLink is based on an Intel Corp. 8086-compatible NEC V-40 microprocessor with 640K bytes of random-access memory.

With a personal computer expansion chassis and an additional 16M bytes of cache memory, the host personal computer can support up to 51 QuickLink boards. In effect, the product allows companies to turn their existing ASCII terminals into local network-connected diskless personal computers.

Each QuickLink board also provides two personal computer communications ports that support attachment from the terminal to a printer and a modem. The firm claims several host personal computers can be linked to expand the QuickLink network capacity beyond 51 devices.

In addition to hosting the QuickLink boards, the host personal computer can be made into a file server by running Novell, Inc.'s Netware/86 or Netware/286 local network operating system. That software allows the connected terminals to share data, resources and applications and exchange electronic mail.

The firm claims the QuickLink product will support interface cards that provide a gateway to other local nets. It also reportedly supports most other communications server offerings, including mainframe gateway products.

Each QuickLink board is priced at \$1,095. The boards are manufactured for The Network Link by InterContinental Micro Systems Corp. of Anaheim, Calif.

The Network Link is located at 3303 Harbor Blvd., Building H-10, Costa Mesa, Calif. 92626, or call (714) 549-9380. □

## ► VOICE MESSAGING

### Voice response units debut at Audiotex

BY JIM BROWN

New Products Editor

NEW YORK — A pair of telephone voice response systems and software that assists users in developing voice response applications were introduced at the recent Audiotex Industry Conference and Exhibition here.

Dallas-based Teknekron Infoswitch Corp. and Los Gatos, Calif.-based Vynet Corp. both released new voice response systems at the show. The systems are designed to guide callers through voice applications and to collect and retrieve data. Any information collected can be stored as voice messages, or it can be passed on to computer data bases.

VMX, Inc. of Dallas and Digital Sound Corp. of Santa Barbara, Calif., also used the show to release software that supports development of customized menu options that guide callers

through voice applications.

Voice response systems answer incoming calls with prerecorded voice messages that prompt callers to enter spoken commands or key in commands using their push-button telephones to enter or retrieve data from a computer. Primary applications include retrieving bank account balances, transferring funds between bank accounts, validating credit cards, entering purchase orders and obtaining airline flight information.

Teknekron Infoswitch's Voice Response Unit (VRU) supports up to 32 voice channels. In addition to recognizing digits entered from a key pad, the Intel Corp. 80286 microprocessor-based product will recognize the spoken digits zero through nine as well as the words yes and no. The VRU will provide a link between voice applications and a host computer data base by

See page 24

## First Look

### Board serves as facsimile, modem, scanner interface

**OAZ Communications, Inc.** introduced an IBM Personal Computer add-on board that provides personal computer-to-facsimile transmission, an integral modem and a document scanner interface.

The Xafax board uses an Intel Corp. 80188 microprocessor with 512K bytes of random-access memory, and it can plug into a personal computer connected to a Winchester hard disk and a floppy disk drive.

The board is also outfitted with a 9.6K bit/sec facsimile modem, a Hayes Microcomputer Products, Inc.-compatible 1,200 bit/sec modem and a small computer system interface that will support connection of an image scanner to the personal computer.

Running in the background while other DOS applications are being executed, the Xafax board features its own multitasking operating system. It will simultaneously retrieve an image from a disk, send a facsimile document and pass a message to the personal computer's host processor for display. The board also performs all the compression and decompression of both image and data as well as several communications functions.

The Xafax board will automatically receive incoming messages and facsimile documents and flash an alert on the user's screen. The message or facsimile document is buffered in the coprocessor's memory and will automatically be com-

pressed and stored as a disk file if the user does not respond after a specified time. The board's RAM typically holds eight pages.

The Xafax board costs \$1,159. **OAZ Communications, Inc.**, 15032 C Redhill Ave., Tustin, Calif. 92680, or call (714) 259-0909.

### Enhanced version of twisted-pair local net

**Fox Research, Inc.** released an enhanced version of its twisted-pair wired local-area network and a repeater that enables users to connect the firm's bus and star network topologies together.

The firm's 10-Net Version 4.0 adds support for the server message block protocols used in Microsoft Corp.'s MS-Net local-area network software and provides interfaces to IBM's Network Basic I/O System. The new version also adds windowing support for the package's Chat and Systems Monitor features. It retains support for such 10-Net features as menu-driven security, network management tools, news, calendar, print spooling and remote job submission.

The 10-Net repeater is designed to link a bus-configured 10-Net local net with a star-configured 10-Net local net in order to extend the overall distance of a 10-Net to beyond 2,000 ft. The unit also features an optional add-on interface for connecting to a fiber-optic cabled 10-Net local net.

Bundled with the firm's 10-Net StarLAN board, the 10-Net Version 4.0 will be available in September for \$695 per connection. The as yet unpriced 10-Net repeater is scheduled for shipment in September.

*Fox Research, Inc., 7016 Corpor-*

rate Way, Dayton, Ohio 45459, or call (513) 433-2238.

### Package links cc:Mail to IBM's PROFS

**PCC Systems, Inc.** released a gateway that allows users of its local-area network-based electronic mail package to exchange E-mail messages and files with users of IBM's mainframe-based Professional Office System (PROFS).

PCC Systems' cc:Mail PROFS-link runs in conjunction with the firm's cc:Mail LAN and cc:Mail Gateway Version 1.4 packages. It can be configured to provide an automatic connection between any local net and an IBM mainframe running PROFS. In order to link cc:Mail Gateway to the mainframe, the user must provide a Hayes Microcomputer Products, Inc.-compatible 2,400 bit/sec modem.

Users of personal computers attached to a local net would address an E-mail message and attached DOS file destined for a PROFS user as if the message were to be delivered to another cc:Mail user. PROFS-link automatically converts the cc:Mail message to a PROFS note, and the DOS file is spooled to the recipient's PROFS reader file. It then connects to PROFS, delivers the message and picks up any messages waiting to be delivered to cc:Mail users. cc:Mail PROFS-link will also convert PROFS messages and IBM's Conversational Monitor System files for delivery to cc:Mail users.

Available in August, PROFS-link costs \$995.

*PCC Systems, Inc., Suite 201, 480 California Ave., Palo Alto, Calif., 94306, or call (415) 321-0430.*

### Mainframe-based telecommunications

**The Cincinnati Bell Information Systems, Inc.'s Communications Management Systems Division** recently announced a modular, mainframe-based software system designed to manage private telecommunications networks.

The **Communications Management System (CMS)** offers nine software modules that can be used separately or together. A master module provides security and coordinates interactions between modules. Other modules support such functions as call accounting and traffic analysis, equipment inventory, work- and service-order tracking, cable records management, on-line call record inquiry, trouble reporting, on-line directory and a message center.

The package will work on IBM mainframes as a CICS application under MVS. The system will support IBM's 3270 data stream and 3270-type interactive terminals. According to the firm, the software system will support as many call records, telephone stations, inventory items and nodes in a network as can be supported on the mainframe. However, in order to be cost-effective, this system should be used to manage telecommunications networks with more than 200 extensions, and it is being aimed at firms that support about 1,000 extensions.

The cost of CMS software modules ranges from \$10,000 to \$65,000 per module. CMS's entire line will be available in 1988.

*Communications Management Systems Division, Cincinnati Bell Information Systems, Inc., 1500 Planning Research Drive, McLean, Va. 22102; call (703) 556-2300.*

## Voice response units debut

continued from page 23

making the voice response system appear to an IBM host as either an IBM 3270 or 5250 terminal.

Data collected as telephone key pad digits or spoken commands is presented to a host computer, which will retrieve needed data and pass it back to the VRU. The VRU will convert the data to speech and read it to the caller. According to the firm, the device will support IBM's Binary Synchronous Communications or Synchronous Data Link Control protocols as well as Burroughs Corp.'s Poll>Select, NCR Corp.'s Polled Terminal Emulation and TTY protocols.

The new product has a menu-driven application development language and is reportedly compatible with all private branch exchanges, Centrex services and trunk types. It can also work with the firm's ACD86 automatic call distributor.

Featuring two hours of voice storage, the firm's VRU is housed in an IBM Personal Computer-like cabinet and priced between \$37,000 and \$85,000. That price also includes a display monitor, keyboard and hard disk.

Vynet Corp. used the show to introduce an IBM Personal Computer AT-based voice response system and application development software. The V4000 system supports as many as 48 voice channels and up to 60 hours of voice storage.

The V4000 system uses Vynet's proprietary VOS4000 Voice Operating System. That software supports menu-driven utilities that allow users to write, digitize and edit

Data collected as telephone key pad digits or spoken commands is presented to a host computer, which will retrieve needed data and pass it back to the VRU. The VRU will convert the data to speech and read it to the caller.

voice applications. It will also support its own data base for stand-alone applications. In addition, the software will interface to other local or remote computer system data bases over standard RS-232- or IBM 3270-type communications links supporting IBM's SDLC.

Vynet's system also allows callers to enter key pad digits in response to voice prompts, access computer data or leave a voice message. Vynet's new offering works with a PBX and automatic call distributors.

Supplied with a keyboard, display monitor, a 60M-byte streaming tape drive and choice of hard disk drives that support between 12 and 60 hours of digitized voice storage, the V4000 is priced in the range of \$75,000.

Vynet also introduced the \$2,500 Voice Application Software Tool (VAST) that allows users to develop voice response applications. Layered on top of Vynet's

Voice Operating System, the package can be used with Vynet's VASTCOM and VAST3270 software to support RS-232- or 3270-type connections between the V4000 and a host computer.

VMX released InfoLink, software designed to allow its Voice Messaging Exchange to give callers a list of up to nine options that will route them to other applications, including data entry and data retrieval. With the \$3,000 InfoLink, a caller will hear a prerecorded greeting followed by a list of up to

nine options, any of which can be chosen by pushing a key pad digit. The caller can be presented with up to 12 lists of nine options each.

For example, InfoLink can be used to relay interest rate information on a variety of loan offerings or savings plans. A caller would be asked to enter a 1 to get loan interest rate quotes or a 2 to get savings plan interest rate quotes.

A list of up to nine different loan or savings options can then be listed. The caller could retrieve information on any of them by pressing the corresponding key pad digit. Another list of up to nine options could then be presented to the caller, including the option to transfer out of InfoLink to an operator or to a voice mailbox.

Digital Sound's VoiceForms software is designed to allow the firm's VoiceServer System to support survey- or questionnaire-type applications. During a VoiceForms application, a caller would enter key pad numbers or spoken answers in response to prerecorded questions. That data would be collected and stored on disk until it can be transcribed.

Up to 50 different VoiceForm applications can be supported by the VoiceServer. The package costs \$4,000.

# As networking takes over the world, Network World takes over the market.

The trend has never been clearer. Networking is now the major application market for communications. And a recent statement by Ken Olsen, President and Founder of Digital Equipment Corporation, substantiates this trend: "We have to start thinking of the computers as peripherals. You start with the network, then you hang the computers on later."

Networking. It's been *Network World's* focus from the very start.

In fact, it is the *only* publication that covers the entire realm of communications from the networking point of view. And in doing so, *Network World* has established itself as the *standard* for communications users already networked or planning to network.

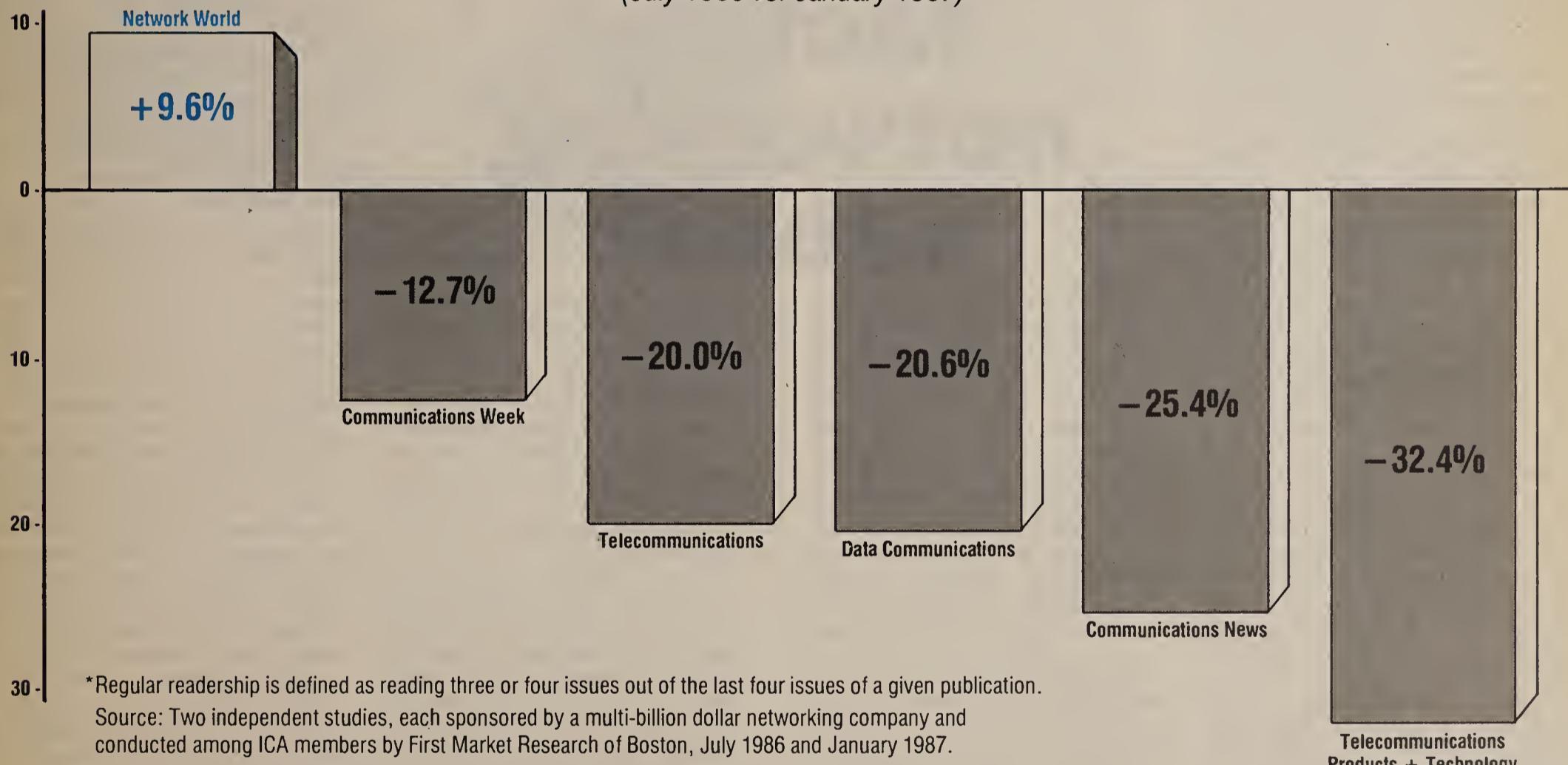
Today's users know they need up-to-date information in order to keep pace with the evolving world of networking. That's why they read *Network World*. And that's

why *Network World* was the only publication to gain in regular readership in an independent study conducted among ICA (International Communications Association) members, some of the nation's most influential buying decision-makers for voice and data communications products and services.

The study, sponsored by a multi-billion dollar networking company and conducted in January 1987 by

First Market Research of Boston, showed decreased readership of all communications oriented publications among ICA members since a previous study in July 1986. Only *Network World*, with its exclusive networking-oriented coverage, experienced an increase in regular readership. The percentage increase/decrease for each publication over that six-month period is displayed in the following chart.

**Percentage Change in Regular Readership\* among ICA Members**  
(July 1986 vs. January 1987)



\*Regular readership is defined as reading three or four issues out of the last four issues of a given publication.

Source: Two independent studies, each sponsored by a multi-billion dollar networking company and conducted among ICA members by First Market Research of Boston, July 1986 and January 1987.

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## NETWORK WORLD

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# Opinions

Digital Equipment Corp. President Ken Olsen recently set off fireworks by saying that in manufacturing automation, Ethernet (IEEE 802.3) is a

practical alternative to the Manufacturing Automation Protocol broadband token bus (IEEE 802.4).

However, both MAP and Ethernet are too valuable to pit against each other in the kind of win-or-lose fire storm that sells newspapers but does little to advance manufacturing automation.

Let's not return to the fanaticism that ruled IEEE Project 802 back in 1982. Instead, let's reposition MAP to be independent of the transmission media. Let's also consider using Ethernet, now by far the most widely installed local-area network technology, as an alternative to the broadband token bus in some manufacturing applications.

The General Motors Corp.-led MAP team bit off more than it could chew when it took on three major standardization projects. Not only did it take on the problem of establishing standards for MAP, it also assumed the problems of perfecting communications transport, or Open Systems Interconnect (OSI), standards and establishing standards for untried broadband token bus local-area network technology.

To the MAP team's credit, there are now some manufacturing automation protocols. MAP also got off to a good start by recommending use of emerging OSI protocols, instead of starting from scratch on transport. However, the MAP team headed down the wrong road when it based its work on broadband token-bus technology.

Two mistakes were made. First, well-structured networking architectures should be independent of transmission media. The current MAP is not. Second, MAP chose the wrong medium. The second problem would be solved almost automatically if the first is fixed.

From its earliest days, MAP chose the broadband token bus for its local-area net transmission medium. This was back when IEEE Project 802 was struggling to find a compromise between Ethernet — proposed originally by DEC, Intel Corp. and Xerox Corp. — and the Token-Ring Network, which IBM later proposed.

The broadband token bus (IEEE 802.4) was designed to

Metcalfe, chairman of Santa Clara, Calif.-based 3Com Corp., invented Ethernet at the Xerox Palo Alto Research Center in the early 1970s. He also serves on the executive committee of the Corporation for Open Systems.

## PRO:

BY ROBERT M. METCALFE

Special to Network World

combine and improve upon the best features of both — bus from Ethernet and token from ring — with the addition of broadband that neither had.

How wonderful it sounded then. The problem was that this technology did not then exist and, as happens to most untried technologies, it was oversold using invalid arguments that still reverberate around the industry.

Many people still assume that because Ethernet is baseband, it is susceptible to electronic noise in the factory. Ethernet cable is quadruple-shielded and has extremely good noise immunity. Further, Ethernet-compatible fiber-optic systems offer complete noise immunity.

Another false assumption is

The Manufacturing Automation Protocol standard was developed specifically to meet factory floor communications requirements. The IEEE 802.4 token-bus protocol was selected as the foundation of MAP because it more effectively meets these requirements than the IEEE 802.3 (Ethernet) or 802.5 (token-ring) standards.

Factories have many unique characteristics that must be considered when selecting a communications network. The typical factory stretches over several square miles, operates within a harsh physical environment and contains many different industrial systems with real-time requirements. The token-bus standard, because of its token-passing pro-

## CON:

BY TONY HELIES

Special to Network World

tory communications. Two advantages of baseband are its large bandwidth and inherent flexibility.

In a broadband network, the

available bandwidth is subdivided into channels — MAP, for example, specifies three channel pairs — which allows more than one network to share a single cable.

Broadband also supports data, voice and video, which means the same cable can support, for example, a communications network, video monitoring system and energy management system.

Another advantage is that broadband networks can extend as far as 25 miles. This means a single network can support communications throughout the manufacturing complex without bridges or repeaters.

Second, broadband is more immune than Ethernet to signal interference commonly found in factory environments. Ethernet's baseband signaling operates at the same frequency level as ambient noise generated by machine tools, lathes and other factory equipment.

By contrast, broadband signals are modulated and translated to a higher frequency that is less susceptible to factory noise.

Baseband is also more flexible to configure. For example, a tap may be placed anywhere on a broadband network. By contrast, an Ethernet specifies a minimum distance of 2½ meters between nodes.

Finally, broadband has long been used in the cable television industry and is a readily available and reliable technology.

IEEE 802.4 networks are used for many applications that would be less efficiently served by Ethernet. For example, a leading manufacturer of aluminum forgings uses an IEEE 802.4 network for facilitywide networking. The manufacturing complex stretches through 15 buildings and contains energy-intensive, harsh industrial operations.

One network channel is used to support manufacturing administration, plant maintenance systems and floor controllers. A second channel supports an energy management system, and a third is used for computer-aided design and manufacturing engineering stations. The network allows any system in the plant to be accessed from a single location.

Since this manufacturing environment is machinery-intensive, Ethernet would be less efficient because of its susceptibility to ambient noise.

Also, a single Ethernet could not satisfactorily handle the processing load resulting from interconnecting the plant's entire data

## Is Ethernet sufficient for factory networking needs?

that token passing is deterministic in the sense that users are guaranteed access within a maximum time, and that because Ethernet doesn't use tokens, it can't deliver data reliably in the time required by real-time manufacturing equipment.

People who think tokens will circulate deterministically around token buses are overlooking the probability of errors — from which Ethernet, unlike the token bus, was built to recover robustly.

Further, the requirements for timely delivery of data in manufacturing automation are grossly overstated, and the ability of Ethernet to meet these requirements under heavy loads is underestimated. I question people who say manufacturing systems are designed such that they could become dangerous if network data is not delivered reliably through a kilometer of cable in a few milliseconds.

After building a 10M bit/sec broadband token bus, the MAP team didn't go back to accept Ethernet. Instead, it invented three new media and transmission methods, the most widely used of which is proposed to be a new,

See **Pro** on next page

token and broadband medium, provides optimal communications in this environment.

Token passing ensures deterministic access to the local-area net, as only a station possessing the token can transmit. The protocol also supports a four-tier message-priority scheme, which lets time-critical systems access the network first.

By contrast, Ethernet uses carrier-sense multiple access with collision detection, a contention scheme in which nodes listen to the line before sending. With CSMA/CD, the probability of collision, and thus retransmission, increases as network load increases. In a typical factory network, which supports hundreds of real-time devices, a deterministic access method is more efficient.

Unlike Ethernet, which uses baseband signaling, IEEE 802.4 also specifies a broadband medium, which is well-suited for fac-

Helies is president of Concord Communications, Inc., a manufacturer of MAP-based local-area networks in Marlboro, Mass. He has over 17 years of experience in the computer and industrial automation industries.

# Opinions

## ►TELETOONS — By Phil Frank

We offer a complete network package.. We install the operating system, configure the software and when none of it works we find you a new job.



## DEPARTMENTAL SYSTEMS

BRIAN JEFFERY

## The IBM Rain Dance

In many primitive cultures, the Rain Dance was a central custom. Entire villages assembled, donned costumes and danced for hours, chanting — usually in vain — for rain.

For some time now, the public has been treated to an IBM Rain Dance aimed at creating demand for departmental systems and IBM 9370s. Chanted rumors are heard through the industry: IBM has 50,000 orders for the 9370, no, 100,000. They are the preferred departmental system. People are queuing up for them. Meanwhile, IBM has only a few hundred units out the door, and the press is frantically combing the land for the apparently mythical 9370 user.

Consultants help. They're forever defining what a departmental system should be and how personal computer users should be able to talk to mainframes.

The 9370 can do all this, they say. Gosh, it's just what we've been saying departmental systems should look like. There's a big market for departmental systems. Ergo, there's a big market for the 9370.

According to senior management in IBM's Systems Products Division, Big Blue sees the 9370 "opportunity area" as about 50% "small and medium business," 35% to 40% "distributed computing" and only 10% to 15% "departmental systems."

What, then, of the great IBM hype for departmental systems?

Some senior IBM managers will admit, reluctantly, that they don't really believe in them. IBM doesn't use departmental systems much internally. It uses many personal computers, but otherwise, it's mostly mainframes and the Professional Office System that handle office applications.

The picture gets more murky when the question is asked: "How many orders does IBM actually have for the 9370?"

Consultants and market researchers use the figure of 50,000, which was originally provided by IBM. With a little prodding, IBM management admits that, er, well, um, that's a round number. The backlog,

*Jeffery is managing director at the International Technology Group, a Los Altos, Calif.-based research and consulting firm specializing in the IBM market.*

they admit, is a little soft.

Much of that 50,000 figure consists of commitments, people who have been reserving a place in the order queue and who might not actually buy the things.

Even more disturbing for IBM is that a high proportion of the "orders" are replacements for 4331 and 4341 machines installed from 1979 to 1983. Many of these are still on lease — IBM didn't start making leasing unattractive until 1982 — and the 9370 is gleefully received as an excellent replacement.

The problem for IBM, of course, is that 9370 replacement orders will start dropping like a rock when the old 4300 base has turned over. It will be the final act of IBM's great rental-to-sales conversion push, which contributes to Big Blue's growth slowdown.

What, then, of those Fortune 500 accounts that are ordering 9370s by the thousands? IBM proudly points to 1,000-unit and 2,000-unit orders. But prod IBM some, and it will admit that a lot of these are multi-year orders.

IBM also inadvertently tipped its hand with the proud statement that production will be fully sufficient for demand in the fourth quarter. This is one of those inoffensive-looking statements that turn out, on closer examination, to be bombshells.

No backlog by Christmas? In a few months, IBM will have filled a supposedly massive demand that has had a year to build up? From the way everyone was talking, it sounded as if 9370s were going to be rationed well into 1988. There's something rather suspicious about this.

It is obvious that the 9370 has been grossly oversold and that the whole idea of departmental systems is, itself, a rather tiresome exercise in hype resting on a very dubious foundation of reality. It is all reminiscent of a Rain Dance.

Fortune 500 companies use lots of minis. Sometimes they buy more; sometimes they replace what they have. Sometimes they use them in a way that might be described as "departmental systems." The IBM Rain Dance won't change any of that, one way or the other. □

processing and manufacturing systems.

Further, Ethernet would not even support an energy management system. Finally, the amount of cabling required to network a 15-building complex would overwhelm Ethernet's distance limitations, even if repeaters were used.

One of the world's largest manufacturers of fuel consumption systems also uses an IEEE 802.4 network for process control. Workstations, engineering and quality control terminals use the network to access data from factory floor controllers. This data is collected and analyzed to achieve zero-defect production.

In conclusion, an IEEE 802.4 network is the optimal solution for factory communications.

The combined characteristics of token passing and broadband effectively meet the extended distance, noise immunity, flexible integration and broad utility required for real-time communications within a manufacturing facility.

It was the recognition of these factors, as well as practical experience, that made MAP's authors select IEEE 802.4 as the world's first standards-based network for factory communications. □

**Pro** from previous page  
slower local-area net technology called carrier band.

Whereas Ethernet was unacceptable because it is nondeterministic baseband, MAP now relies on its own carrier band, which is — guess what? — baseband by another name.

If extreme noise immunity is so important, and baseband doesn't have it, why is carrier band acceptable? And what about the assumptions of determinism?

Previous arguments about the relative determinism of token bus and Ethernet have assumed both were running at 10M bit/sec. But who can argue that a heavily loaded 1M or even 5M bit/sec carrier band MAP network can ensure greater probability of timely data delivery than a 10M bit/sec Ethernet?

The good news is that the fanatics are calming down. Media independence is already being achieved through the Corporation for Open Systems and the merger of MAP and Boeing Computer Services Co.'s Technical and Office Protocol.

The issue of how best to move packets around factories has been opened up, and Ethernet is getting its day in court. □



NETWORK WORLD

**Features**  
June 29, 1987

## Special Section: ISDN

# Circuit strategies

*Uncertainties have many managers plodding the course.*

BY MARY JOHNSTON

Special to Network World

Long-term success in any technological endeavor requires that all participants weigh the risks and advantages of multiple alternatives.

The advantages of the Integrated Services Digital Network concept — to provide a limited set of user interfaces and protocols capable of supporting ubiquitous, feature-rich digital communications — are endorsed by all. However, the current lack of technological standards poses great problems and risks for managers attempting to plot long-term communications strategies.

Some companies are choosing to ignore ISDN until it's proven in the market. Others are investing extensive resources in technology trials. Many organizations are taking the middle ground, using the acronym in plans but still feeling uneasy about its yet to be demonstrated advantages.

*Johnston is a senior consultant with BBN Communications Corp. in Cambridge, Mass.*

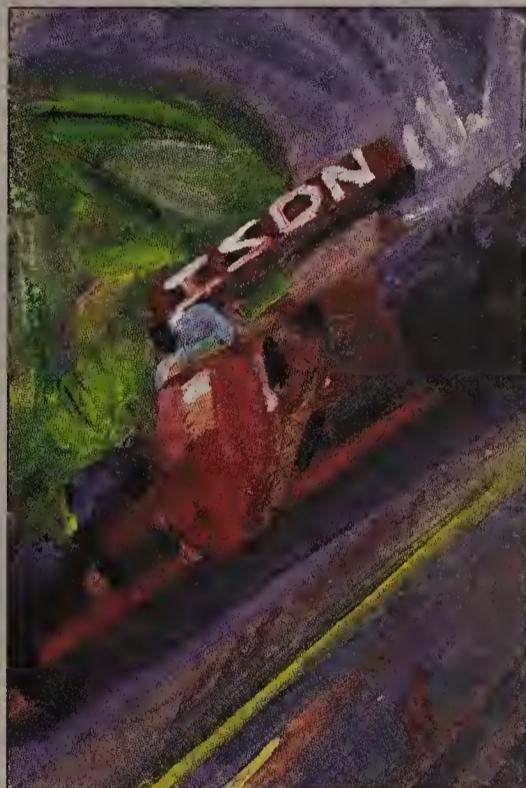
Whatever strategy is being considered, it is likely to be an attempt to avoid investing in equipment and services that may soon be obsolete while having few hard facts on which to base an assessment.

The list of uncertainties regarding ISDN is headed by the following:

■ **Standards.** Organizations continue to bicker over ISDN services, functions and protocol coding. Users resist investing in technologies that may have to undergo extensive upgrades due to changes in standards. In particular, ISDN support for private packet data networks and local-area networks drags way behind specifications for voice services.

■ **International divergence.** Multinational companies are acutely aware of variations in North American and European communications standards. Users cannot be

guaranteed how well international ISDNs will interwork until the 1988 Consultative Committee on International Telephony and Telegraphy plenary session is concluded, codifying the international consensus on ISDN standards for the next four years.



■ **Enhanced services.** Early ISDN demonstrations have exhibited few unique applications. For the most part, they mimic services available through conventional technologies. Vendor scenarios for proposed value-added services are often predicated on ISDN being almost universally available, when in fact it will come first to isolated metropolitan "islands."

■ **Pricing.** No vendor in ISDN development, whether it is a local telephone company, long-distance carrier or customer premises equipment manufacturer, has provided detailed pricing information for ISDN. Lack of this information

*Continued on next page*

From previous page  
makes cost/benefit analysis impossible.

All of the above are solid reasons for skeptical responses to ISDN. And, indeed, they are precisely why both vendor deployment and user acceptance will be slow.

But despite the fact that ISDN is unlikely to really make a difference to most U.S. users until 1992 — perhaps 1990 in Europe — it has crossed over the planning horizon and now must be treated seriously.

Effective communications management and strategy requires planners to evaluate ISDN with healthy skepticism. They must design long-term network architectures that can take advantage of ISDN yet also enable the adoption of alternatives if ISDN fails.

#### A child of the telcos

To understand why ISDN looks as it does today, one must recall that it is the child of telephone companies: AT&T, the Bell operating companies and the national Post, Telegraph and Telephone administrations of Europe.

These organizations have been forced to develop ISDN in response to requirements for better operational and management support for public common carrier networks. Development has been tied closely to the fact that digital circuits have been largely unavailable in Europe until recently.

Consequently, ISDN will be introduced just as the European networks begin to make end-to-end digital services commercially available. The American telephone companies, by comparison, have supported digital services for some time via the digital data service network, which is maintained separately from the basic dial-up network.

Given that the bulk of money spent on communications goes to voice services, it is not surprising that early ISDN standards efforts have made voice, or circuit-switched, networking the top priority. And, given the domination of international standards activities by the PTTs, it is not surprising that standards for premises equipment and interworking with private data networks were given low priority.

The insistence of competition-oriented U.S. companies has caused the CCITT to give priority to studying standards for issues such as private branch exchange-to-private branch exchange interworking, packet mode standards, schemes for merging public ISDNs and private local-area networks, and network interface standardization.

In some cases, such as PBX-to-PBX links, the standards will build on protocols already developed. In other cases, such as interworking with packet networks, the current thought is to develop a slow evolutionary path.

Packet mode standards are a particularly sensitive issue. The U.S. market supports a large number of private packet networks,

while many European countries have only one public packet option. Current U.S. ISDN/packet connection standards efforts, on which the current ISDN trials are based, rely on circuit-switched ISDN connections to non-ISDN packet handlers owned by the packet network, not the telephone network.

The only ISDN element is the use of the Q.921 and Q.931 protocols for the setup and tear-down of the circuit-switched connection.

Current standards call for true packet-switched connectivity as

**Despite the fact that ISDN is unlikely to really make a difference to most U.S. users until 1992, it must be treated seriously.**

packet handler modules are added to ISDN central systems.

Interconnection of ISDN-based equipment and local networks is a more difficult issue. The 1.5M bit/sec-to-2M bit/sec range primary rate of ISDN is greatly outstripped by the throughput supported by local nets. That throughput is currently 10M bit/sec and will soon approach 100M bit/sec as use of fiber-based local net technology grows.

Standards for local-area networks and ISDN interworking are likely to stagnate until wideband ISDN channels are defined.

As the 1988 CCITT plenary approaches, the U.S. delegation will be quite active in requesting that attention be paid to these issues.

However, the PTTs in the CCITT membership may prefer to allocate resources for improving telephone company functionality, rather than worrying about private network issues.

Consequently, it is difficult to determine how many U.S. priorities will be addressed.

Should significant issues be ignored by the CCITT, the North American standards groups such as T1D1 may be forced to issue their own North American subset of ISDN standards.

These would only be binding on equipment developed for the North American market. This could result in significantly different North American and international ISDN functions and capabilities between 1988 and the following CCITT plenary in 1992.

For multinational users, such a move would eliminate any hope of unifying American and European equipment procurements. For vendors, it would increase the amount of money needed to be invested in ISDN development, raising user costs and slowing development of

enhanced features.

#### Networks can't wait

The business requirements of corporate telecommunications cannot wait for the deliberations of international standards groups. Many organizations are racing to install integrated T-1 backbones, local-area networks, intercompany data networks, integrated voice/data management systems and a vast array of other solutions to existing problems. For the most part, these solutions are dependent upon equipment using proprietary, non-ISDN-based protocols.

Even the BOCs, which have the most to gain by steering clients toward ISDN, are offering alternatives. While Pacific Bell has been planning its Bay Area ISDN trial for July 1987, it has also been actively testing Project Victoria, an "integrated" residential service, which bears no resemblance to the ISDN standards.

ISDN calls for a basic 2B + D interface — two 64K bit/sec data channels and one 16K bit/sec signaling channel — to replace the line into most residences. The Project Victoria interface provides for up to seven different information channels: two for voice, one for medium-speed data and four for low-speed data.

Its goal is to provide residential users with a wide array of entertainment and personal electronic services, including data base access, home banking, meter reading and others. The service is based on existing multiplexing technologies and does not use any ISDN protocols.

BellSouth Corp. offers a similar multiplexer-based alternative aimed at business applications via its Simultaneous Voice and Data

**Even the BOCs, which have the most to gain by steering clients toward ISDN, are offering alternatives.**

Service. However, due to a recent FCC ruling requiring that the Project Victoria multiplexer be treated as customer premises equipment, rather than as an element of the BOC network, previously scheduled market trials are on hold.

As ISDN is introduced, the BOCs must decide upon pricing incentives to steer users toward ISDN or to proprietary multiplexer-based services, as appropriate.

Users with low-speed data requirements may find that the proprietary applications are more attractive financially and do not require the use of terminal adapters. These proprietary services are likely to play a transitional role, providing ISDN-like environments

to users while extending the useful life of existing terminals.

Interested users should scrutinize carrier ISDN pricing decisions and the price differential between ISDN and proprietary services. With the telephone companies hedging their bets, it would be wise for users to consider their alternatives.

#### Evolutionary technologies

The ISDN of the 1980s, featuring 64K bit/sec basic rate access, will not be the end of network technology development. Already under development are the 100M bit/sec Fiber Distributed Data Interface, 135M bit/sec-plus wideband ISDN and high-speed, hybrid circuit/packet switches.

But, telecommunications managers must make procurement decisions while these technologies are being refined. Users should plan for the ability to interwork with ISDN common carrier services and evaluate the role ISDN can play at the customer premises level.

In some cases, ISDN PBXs connecting integrated voice/data terminals may be preferable to separate PBX and local network wiring schemes, at least at relatively low data rates. In other cases, high-capacity dedicated local-area networks may be preferred. In either case, users should buy from vendors that have demonstrated plans for accommodating ISDN in the 1990s.

If a corporate decision is made in favor of ISDN, it is important that it be presented as a long-term strategy, not a solution to be enacted in 1987 or even in 1988. Users interacting with European networks will encounter some ISDN applications in 1988 and 1989, but most domestic users will see few of its benefits until 1991 or 1992.

From 1988 through 1991, ISDN will be given the opportunity to prove itself to American users. The majority of companies can learn from the few technological trailblazers, such as hamburger empire McDonald's Corp., that will be participating in ISDN trials during this period (see "Users reflect on ISDN trials," page 31).

The next two to three years will be an excellent period for considering ISDN's impact on corporate networks in the 1990s. Equipment bought today should be upgradable, in case ISDN functionality is proven beneficial.

Over the next five years, many users organizations will opt for integrated environments. A good number of these will rely on T-1 backbones, supported by non-ISDN proprietary multiplexers and protocols. The aim will be, as it is today, to adequately support the business of the corporation in a cost-effective manner.

So long as there is a plan for smooth migration between these implementations, as well as between eventual ISDN standard protocols and interfaces, users should not have to suffer the costs of early equipment obsolescence.

With regard to ISDN, corporate planners should first focus on

Continued on page 39

## Special Section: ISDN

# Users reflect on ISDN trials

*Early users judge the BOCs' initial integrated offerings.*

**Continued from page 1**

Testing of advanced voice features has generally been held up because software supporting these capabilities is not yet available. ISDN trial participants with private branch exchanges don't seem to mind, however, because they're already familiar with promised voice features such as call forwarding and call waiting.

#### What's hot

The hottest ISDN voice application tested so far is caller identification. The calling party's telephone number is listed on the small display screen on the called party's

digital telephone set. If the called party is away from his desk, his telephone will indicate, on screen, that a message is waiting. The current drawback is that only individuals connected to the same ISDN switch can identify each other.

ISDN's ability to handle voice and data simultaneously is virtually taken for granted by trial participants. Although most trial users are testing integrated voice and data, many mentioned it as an afterthought. One popular application under evaluation is interactive editing, in which two users simultaneously view and update a document while discussing it over the telephone.

By contrast, few telecom manag-

ers are testing video applications. "The quality of the video right now is like communicating with Mars," says Murray Robertson, marketing planning administrator for General Telephone Co. of California. Intel Corp.'s Corporate Telecommunications Senior Strategist Donald Melvin, who tested videoconferencing as part of a Mountain Bell trial in Phoenix, agrees that the video now available over ISDN is not of commercial quality.

Melvin isn't giving up on videoconferencing, however. "We realize that a year from now the video compression algorithms will be twice as good as they are now," Melvin says. Intel had been looking

Continued on next page



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into setting up a private ISDN network before being asked to participate in the trials, according to Melvin.

A more popular application is high-speed facsimile transmission. Earl Vogt, telecommunications manager at U.S. National Bank of Oregon, has tested Group IV facsimiles operating at 64K bit/sec with Pacific Northwest. Several telephone companies, including Mountain Bell and General Telephone of California, also plan to test high-speed facsimile during their internal trials.

Equal access for all

ISDN is creating the most excitement, however, in its ability to provide ubiquitous access. Trial participants are impressed with the sheer range of equipment that ISDN can connect.

The State of Arizona's Department of Administration, another Mountain Bell trial participant, exemplifies this: The agency is using ISDN to link just about every conceivable combination of computers and terminals.

Connections in this trial include mainframes to minicomputers, minicomputers and mainframes to asynchronous terminals, mainframes to personal computers and 3270 emulation.

Many of these connections are made using terminal adapters,

with communication occurring over the B channel, says Matthew Whittington, communications network engineer in the Data Management Division of the Department of Administration.

For terminal-to-mainframe communications, Whittington is also testing X.25 for use over both the B and D channels. The packet-switching technology allows for shorter sessions with the host, which means more terminals are able to share one front-end processor, Whittington says. In addition,

sources. Packet switching offers some great features, such as precise billing information."

Speeds are impressive

Like Whittington, many other trial users are enjoying the increased data transmission speeds and line consolidation ISDN provides. "I'm impressed with the baud rate increase," says Emil Karau, manager of telecommunications networks at Honeywell Bull, Inc.'s Phoenix operation. Honeywell cut over roughly 40 ISDN

points at the second site via ISDN lines. "Instead of using three or four private circuits, we're using one ISDN line," Karau says.

Intel also began its trial in the Phoenix area in February, says Melvin. "Users are happily using ISDN as if it were their one and only way of communicating," Melvin says. "Some of them are a little hesitant to give it up because it improves their service considerably."

The Intel users who have seen the biggest performance jump are those whose terminals were previously tied via coaxial cable to a local cluster controller. The controller was, in turn, linked to a remote host via a 56K bit/sec line. As a result, the 32 users whose terminals were hardwired to the controller had to share a single 56K bit/sec line.

Now, users' terminals are tied directly to an ISDN line. Using an AT&T product that Melvin calls a throttle-down device, the data stream from the 3270-type terminals is put onto the ISDN line at 64K bit/sec. The data travels to the central office, where it is switched to the remote host computer. A second throttle-down device sits in front of the cluster controller, which is now channel-attached to the host.

"Each user now gets more bandwidth than the whole cluster controller used to get, so the response

Continued on page 35

## ISDN is creating the most excitement, however, in its ability to provide ubiquitous access.

packet switching provides both security and a way to account precisely for mainframe usage.

"Sharing is a key word for us — it's something we look for in our trial applications," Whittington says. "We're looking for ways ISDN can be configured to become a highway for people wanting to access our data centers. Using ISDN, we can manage, with great precision, not only the physical connection, but the necessary accounting and security that comes along with managing shared re-

lines in February. Two facilities seven miles apart are linked, and ISDN lines have replaced dial-up lines used to communicate between the two sites.

"Our normal dial-ups are 1,200 baud," Karau notes. "We're now running 9.6K baud, so you're looking at an eightfold increase in the transfer rate."

In addition, computers at one site that are responsible for building control, including monitoring of fire and temperature sensors, also control environmental check

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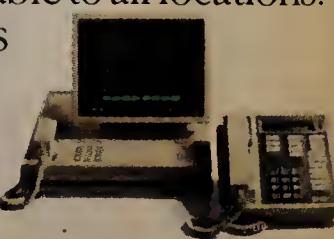
# How to get all your business

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The solution: the AT&T System 85. No other voice and data system today helps streamline communications among far-flung business outposts so effectively. In an AT&T System 85 environment, the switches and systems at all of your locations can work together as

one switch, one system. Result: Voice and data applications work the same way everywhere. Information at any one location is instantly available to all locations. Everybody in your organization is fingertip-close to everybody else.

Across the hall or across the country, the AT&T System 85 permits people using different kinds



# INDUSTRY UPDATE

## AT&T equipment revenue by segment

Revenues	1984	1985	1986	1987
Rentals	\$7,217.3	\$5,788.8	\$4,850.0	\$4,074.0
AT&T Technologies, Inc.	\$5,965.0	\$6,860.0	\$6,723.0	\$6,814.0
AT&T Information Systems	\$4,205.0	\$4,500.0	\$3,800.0	\$4,100.0
Total product sales	\$10,170.0	\$11,360.0	\$10,523.0	\$10,914.0

SOURCE: E.F. HUTTON &amp; CO., NEW YORK

## ► INTERNATIONAL TELECOM

# France attempts to smooth U.S. feathers

BY KARYL SCOTT

Washington, D.C. Correspondent

WASHINGTON, D.C. — French telecommunications officials recently played hosts and peacemakers to U.S. government and industry officials here, in an attempt to improve trade relations in the wake of the French government's decision not to award the sale of a French telecommunications manufacturer to AT&T.

Officials from the French Post, Telegraph and Telephone administration, Direction Generale des Telecommunications (DGT), and from the French telecommunications industry addressed a variety of trade and technology issues at a

seminar sponsored by France Telecom, Inc., the U.S. subsidiary of DGT.

DGT's Director General, Marcel Roulet, told the group that his country's decision to award the sale of the state-owned Cie Generale des Constructions Telephonique to Sweden's LM Ericsson in April was not politically motivated but based only on technical and commercial considerations.

AT&T lost the bid because the technology it would have implemented in France — the 5ESS central office switch — would have required a great deal of alteration to work in the French public network. This would have taken more

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## BRIEFS

**Corvus Systems, Inc.** signed an agreement valued at \$3 million, under which the company will sell workstations and network servers to **Control Data Corp.** for resale to CDC's customers.

William R. McCarthy, formerly vice-president of planning and business development at **Infinet, Inc.**, was appointed to the post of president and chief executive officer of **Tesdata Systems, Inc.** As previously announced, Tesdata has agreed to merge with Infinet.

**British Telecommunications plc** announced an 11.7% increase in pretax earnings for the fiscal year ending March 31, 1987. Earnings in fiscal 1987 were \$3.3 billion. Revenue for the fiscal year was \$15.2 billion, a 12.4% increase over the year earlier.

**US Sprint Communications Co.** recently appointed Earl E. Lawson executive vice-president of finance and MIS and Phillip C. Cooke senior vice-president of human re-

sources. Lawson previously served as vice-president and controller of **GTE Corp.**'s product and systems group. Cooke previously served as vice-president and senior human resources officer at **Citicorp**'s U.S. Card Product Group in New York.

**ComStream Corp.** of San Diego recently appointed Scott Smull vice-president of finance and Aaron Angle vice-president of operations. Smull previously served as corporate controller and finance and administration director at **Integrated Software Systems Corp.** Angle was vice-president of operations in charge of commercial high-volume communications products at **M/A-Com Linkabit, Inc.**

**Ansa Software Co.** and **3Com Corp.** recently announced an agreement to jointly market Ansa's multiuser data base, Paradox 2.0, with 3Com's 3System. In order to introduce Paradox 2.0, the companies will sponsor a 12-city seminar series for corporate users, developers and value-added resellers. □

## Infotron boosts bottom line

Infotron Systems Corp., which in its fourth quarter suffered a round of layoffs and an earnings loss, announced that its Infostream NX series of T-1 multiplexers has generated more revenue and unit shipments than any new product line in the company's history. Since the Infostream introduction in February, 32 unit sales have contributed \$1.5 million in sales, which should provide a welcome boost to Infotron's bottom line.

## ► MANAGEMENT

# User as vendor: A new viewpoint

*Job change changes perspective.*

BY PAM POWERS

Senior Editor

Next time you wonder about vendors and the wide gulf that separates your needs and their products, talk to someone like Norman Gentry, Richard Courtney or John Hart — they've worked on both sides of the business.

After looking at things from the vendor point of view, Gentry and Courtney came back to being users, but with a decidedly different approach to vendors. Hart remains with a vendor, but he hasn't forgotten his user roots.

"Every user wishes he could talk to vendor design engineers to create a product that answers his needs, and believe me, every design engineer wishes he knew what the user wants," said Gentry, communications manager for WSI Corp. in Medford, Mass. Gentry spent more than two years at Codex Corp. as an electrical engineer in group development of network management software.

Although he enjoyed his stint at Codex, Gentry said the position didn't suit him because of the large company bureaucracy and, more

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## INDUSTRY EYE

PAM POWERS

# Value-added network landscape still shifting

**T**he value-added network (VAN) vendors must feel a little beleaguered lately, what with all the unsolicited attention they've received from the Federal Communications Commission.

Things first took a bad turn when deregulation allowed the Bell operating companies to offer protocol conversion as part of their enhanced packet network services.

A second blow was dealt to the VANs, or so they felt, when the FCC more recently decided that enhanced services will continue to be classified as enhanced but need no longer be offered through a separate BOC subsidiary.

The VANs railed against those decisions, perceiving the BOCs as unfair competition. But over time, it has become clear that the BOCs will more likely couple their intra-local access and transport area services with the VANs' inter-LATA services.

That would be mutually beneficial to both parties: The BOCs could offer their users easy access to inter-LATA services, and the VANs would be able to provide better service

within the local loop.

Since only a negligible trickle of annual VAN revenue is contributed by users with intra-LATA data traffic, what they lose to the BOCs won't hurt them, the VAN providers contend.

But the possibility of FCC-imposed access charges recently proposed by the agency for VANs ("FCC plan would make VAN costs skyrocket," NW, June 15) poses a more serious threat.

If some of the calculated per-terminal-hour charges now being bandied about are correct — Telenet Communications Corp. estimates approximately \$4.50 — the vendors and users of public data networks (PDN) are in for a painful surprise.

It's pretty much axiomatic that Tymnet/McDonnell Douglas Network Systems Co. and Telenet will pass these costs on to the information services companies, who will in turn pass them on to users.

From what can be determined about the VANs' financial health in the absence of raw data, they operate with much-less-than-substantial

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## A new viewpoint

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importantly, the work required specialization, while he prefers the more generalized duties associated with a communications manager's job.

The user-vendor-user path taken by Gentry has given him a better understanding of the gulf separating the two camps. He said product designs often do not fit user needs because the engineers don't have direct access to users.

"When I was at Codex, engineers used to beat a path to my door asking what problems I had as a user and how I addressed them," Gentry said. "The engineers read books, but real life in the communications world doesn't fit those textbook accounts."

His vendor experience has proven invaluable, Gentry said, because he now knows who to call at a vendor company to get answers about how products work. He also knows how products will respond if installed in an unusual configuration.

Richard Courtney was the manager of data communications for Transamerica Corp. for four years before joining Racal-Milgo, Inc. in Sunrise, Fla., as product line manager for network management systems.

"Very few people in the vendor community have actually run a network on a day-to-day basis, which is quite different from designing a product on functional specifications based on what the vendor thinks the user wants," Courtney said.

Courtney, who was offered the Racal-Milgo position when he was president of the company's users group, said he empathizes with the vendor's difficulties. "Users have very little idea what an involved, complicated process it is getting a product out the door," he said.

Vendor/user relationships could be vastly improved if vendors hired communications managers for their staffs more often, Courtney suggested. "I can give Racal-Milgo a user's point of view on a daily basis," he said. "That's invaluable for both sides."

Courtney said that, in addition to his user perspective, his managerial skills and knowledge of the Racal-Milgo Communications Management Series (CMS) product line transferred well into his new position as a product line

manager.

John Hart, now director of the telecommunications marketing group at Digital Equipment Corp. in Maynard, Mass., brought a similar set of skills with him to DEC after his seven-year stint as Gould, Inc.'s director of corporate telecommunications.

Hart's migration from the user side to the vendor side was a carefully

planned one, he said, built around a conviction that he would best serve the industry and his career aspirations by knowing both sides of the business.

Hart said his experience at Gould was enjoyable because the company was forward-thinking and believed in using the network as a strategic asset. But his transition to the vendor side has given him "the

luxury of strategic and long-term planning," he said.

"I have gained the skills of a business manager, instead of a firefighter or problem manager," which is what Hart said he feels most users unfortunately are.

Hart said he enjoys being in less of a "react mode," and like Courtney, believes his knowledge of user

needs has aided him in his new role as marketing director. No matter where he ends up, Hart said his experience on both sides of the business is all part of a well-laid career plan that will provide him with a complete range of communications-industry skills.

"I knew from the beginning," he said, "I wanted to see this industry from every angle." □

# Send Moby The Cou Twenty-Two

## With Racal-Vadic's 9600 VP Dial-Up Modem.

Herman Melville would have loved it. With a 9600VP high-speed modem, he could have sent his *Moby Dick* manuscript—all 1.2 million characters—from his PC to his publisher in less than half an hour, error-free. With a 1200 bps modem, the same trip would have taken more than 2½ hours.

Alas, the 9600VP arrived about 150 years too late for the seafaring author. But not for companies that need to pilot whale-size files through the switched phone network, where you need a lot more than speed: you need performance.

No other dial-up modem performs like the 9600VP. It cruises at 9600 bps and precisely slows down and speeds up as line conditions vary. And the 9600VP's

dependable high-speed error control only retransmits bad data blocks—and nothing else.

The 9600VP won't make waves in your existing network, either. It works in sync and async, with PCs and terminals, with 212s and 103s. In fact, it's made to work with every kind of modem, computer and communication software you're likely to find on a dial-up network today.

And the 9600VP not only costs less to buy, but saves a lot of money in line charges and personnel time. So it won't cost you an arm and Captain Ahab's other leg.

So call Racal-Vadic today at 800-482-3427, and ask for a free demonstration. Then see why thousands of 9600VPs are already out there moving fat files through the real world.



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## France smooths

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time and financial resources than DGT was willing to invest, Roulet said.

Roulet went on to say he hoped the decision would not harm future trade relations with the U.S. "This was only one matter," he said. "We ask you to withhold judgment. Do not

judge our policy by one decision, but over time."

As the French telecommunications system is deregulated and state-owned telecommunications companies become privatized, there will be increasing opportunities for U.S. companies to participate in the French market, Roulet and other officials said.

While U.S. government and industry representa-

tives at the seminar declined to comment on the record about France's attempts to open its market to U.S. companies, off the record, several U.S. officials said France has done little more than give lip service to competition.

France took the first step toward deregulation of the state-owned telecommunications authority last year when legislation was

passed creating two separate telecommunications entities.

The DGT was designated as the telephone service company and the Commission Nationale de la Communication et des Libertes under the Ministry of Posts and Telecommunications was made responsible for regulatory matters.

"In France, we are evolving toward a separation of

the regulatory role and the operational role. The DGT will not be the arbiter of private sector entry," Roulet said.

Roulet said the DGT will remain the principal supplier of basic telecommunications services, "because this is a social responsibility, and we are not likely to alter this fundamental precept."

The relative size of the French telecommunications market also limits the scope of competition for local and long-distance service, said Marc Danelot, director of the Cabinet of the Ministry of Posts and Telecommunications.

"The DGT is approximately the size of one regional Bell holding company. The extent of competition is thus limited on practical grounds," he said. □

## Landscape shifting

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profit margins.

Constant upgrades to and expansion of the network, coupled with the cost of leased network capacity, make the business a very expensive one. There is simply no way that they can absorb access fees as well.

That means, of course, that the user will bear the brunt of the fees, which may result in a mass exodus from the PDNs. Then Tymnet and Telenet are left with a dwindling revenue stream and a smaller user base among which they must distribute the fixed cost of operating a PDN.

But the FCC contends that future subscriber line charge increases will swiftly diminish the cost of per-hour access for the VANs, as the burden of fees is shifted to the consumer and away from business.

In that case, the \$4.50 per hour Telenet has calculated would look more like \$2 or less, and the size of that charge looks potentially much less disastrous for VAN business.

Since it's all still very much up in the air, it is difficult to make accurate predictions about whether the charge will even go through, let alone what impact it will have.

But one has to trust that the FCC is anxious to promote innovation in information services, and if a per-hour usage charge threatens the health of those services, something will probably be done to offset the damage. □

# Dick Across ntry In Minutes Flat.



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networking

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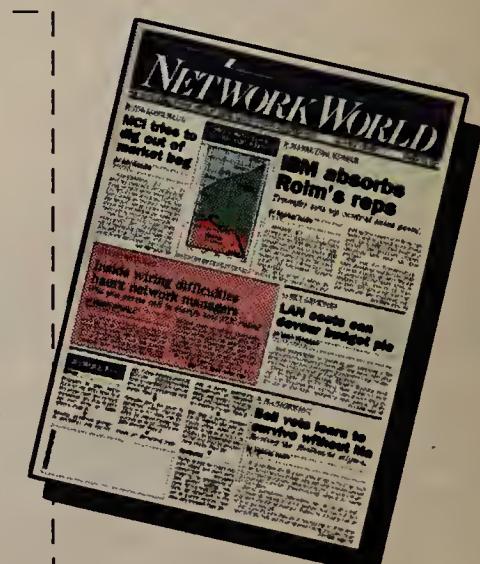
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## NETWORK WORLD

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# TELECOM TRENDS

## TEL Electronics signs with Best Western

TEL Electronics, Inc., a call accounting systems vendor based in American Fork, Utah, recently inked a two-year national account dealer agreement with Best Western International.

Under the arrangement, TEL Electronics will provide the lodging chain with 700 TEL Systems. These systems will be used with BestNet, Best Western's corporate communications network.

### ► SALES PACT

## Firm sells voice mail via Amway

*Amvox signs with Centigram Corp.*

BY BOB WALLACE

Senior Editor

SAN JOSE, Calif. — Amvox Corp. recently penned a three-year sales pact, valued at \$20 million, with voice-messaging systems vendor Centigram Corp. as part of a plan to offer automated telephone answering and voice-messaging services to medium-sized and small users in 35 cities by year's end.

Amvox, a business partner of Amway Corp., is a privately held company that installs and maintains Centigram VoiceMemo voice-messaging systems. Amvox will sell these voice-messaging services through Amway's network of 700,000 distributors. This marketing group rang up sales of Amway home and personal care goods totalling \$1.3 billion in 1986.

The IBM Personal Computer-based Centigram systems, which also incorporate Tellabs, Inc. trunking equipment, will be located in Amway offices close to Bell

operating company central offices with wide geographic coverage.

A caller trying to reach an Amvox voice-messaging office would dial a seven-digit direct inward dialing (DID) telephone number. The call would be routed through the central office switch and over a DID trunk to the Tellabs gear, which converts this trunk line into a two-wire ear and mouthpiece line. This line connects directly to the voice-messaging system.

Amvox said the services will first be made available in New York, Los Angeles/Orange County, Chicago, Dallas/Fort Worth and Miami. Amvox's voice-messaging services will be tailored to meet the needs of small businesses and branch office locations of larger corporations that wish to avoid the cost of purchasing a corporation-wide voice-messaging system.

A Centigram spokesman said this agreement represents the single largest sale in the company's 10-year history. The Centigram-

Amvox deal is Amway's third telecommunications venture. Otto Stolz, Amway's executive vice-president, said the company has sold roughly \$120 million worth of long-distance communications services for MCI Communications Corp. since early 1986. Amway has also sold satellite equipment and programming through Starion Entertainment, a partially owned subsidiary company. Stolz said the firm's next foray will be into the cellular paging business.

Centigram predicted users will pay from \$12 to \$30 monthly for the offering, depending on the number of messages the voice mailbox is set up to handle and whether such features as call forwarding are used. Those with mailboxes on the system could call in and receive messages without operator assistance.

Three flavors of the voice-messaging service will be available. Amvox I can store up to eight messages at a time, each a minute long, for up to six days and carries a suggested retail monthly price of \$12.95. Amvox II can store as many as 16 two-minute messages for up to eight days and may cost \$19.95. Amvox III stores up to 32 two-minute messages for as long as 16 days and carries a recommended price of \$26.95. Amvox II and III feature a capability enabling users to forward messages. □

### CROSS TALK JOHN DIX

## Private nets will survive ISDN

Private networks are often pitted conceptually against Integrated Services Digital Network environments, but they are not mutually exclusive.

Although ISDN presumes customers will come to rely on intelligence within carrier networks, users who prefer private networks will still be able to reap ISDN benefits by using customer premises equipment compatible with the standards.

It is possible, in fact, that private ISDN networks could evolve more quickly than commercially available ISDN carrier services. Hybrid networks — part public ISDN and part private network — could also provide an attractive option for some companies or a good migration path.

In concept, ISDN will enable customers to integrate multiple voice and data channels over the same carrier access trunk, and, once inside the carrier net-

work, fan out these channels and individually route them.

The composite access trunks will include voice and data B, or bearer, channels, which are controlled by a D signaling channel. The so-called out-of-band D signaling channel will enable customer premises equipment to configure the B channels on a call-by-call basis by interacting with carrier-based switches. A channel used to carry voice one minute could be reconfigured the next to carry data to a different location.

However, corporations can build private ISDN networks by using ISDN-compatible customer premises equipment linked with clear-channel T-1 1.54M bit/sec digital transmission facilities, the ISDN equivalent of an Electronic Tandem Network (ETN).

Private ISDN networks rely on the switching, routing and control intelligence of the customer premises equipment and

do not require interaction on an intelligent basis with the public network. A company could, for example, build a network using AT&T System 85 private branch exchanges that support the CCITT primary rate interface, which segments a clear channel T-1 facility into 23 B channels and one D channel. Networking the D channels of multiple T-1 pipes in this environment would provide the equivalent of a carrier-signaling network used to control network links.

Richard L. Snowden, director of the concept development center for AT&T's Business Markets Group, said the evolution of private ISDN networks will not hinder the development of commercial ISDN services. Snowden said AT&T would support private ISDN networks with the same enthusiasm it has given ETN networks. "I think we'll see a number of purely private ISDN nets," he said. □

## TELECOM TIDBITS

Southern Bell Telephone and Telegraph Co. recently announced that AT&T Network Systems Group and Hayes Microcomputer Products, Inc. will use Integrated Services Digital Network services when Southern Bell cuts over its first commercial ISDN in March 1988 at its Dunwoody central office in Atlanta.

AT&T's Network System regional headquarters in North Atlanta will use approximately 400 to 450 2B+D basic rate lines, each providing the equivalent of two B, or bearer channels, for voice or data lines and a separate D signal channel.

Southern Bell will serve the location by installing a 5ESS central office switch module in office space leased from AT&T.

Southern Bell will provide Hayes Microcomputer Products with basic rate ISDN lines at its Norcross, Ga., facilities using T-1 carrier technology to span the distance from the Dunwoody central office.

Hayes will use the service for engineering development, electronic mail, personal computer-to-personal computer file transfer, order entry, voice communications and facsimile transmission.

Digital Sound Corp. of Santa Barbara, Calif., recently announced the signing of an OEM agreement valued at \$1.7 million with Ericsson Information Systems, Inc. of Richardson, Texas.

The agreement calls for Ericsson to market Digital Sound's VoiceServer System, a Unix-based system that is designed for general-purpose voice processing and storage.

The VoiceServer may be utilized for different purposes, including voice mail, voice response or audiotext.

Microvoice Corp. of Irvine, Calif., recently introduced an entry-level automated operator system that answers four calls simultaneously.

The four-port Apex can support up to 100 incoming private branch exchange trunks and provide user option menus to route calls to 512 different department, subdepartment or individual extensions.

The Apex system allows small business users to have 24-hour call processing with special messages at night, during the day or on weekends.

In addition, a microphone allows users to revise and update operator messages on site. The Apex automated operator system costs \$7,995. □

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# DATA DELIVERY / NET MANAGEMENT

## ► INTERNATIONAL STANDARDS

### Management standard near

*OSI network management framework ahead of schedule.*

BY MARY PETROSKY

West Coast Correspondent

TOKYO — A framework for international network management standards recently moved a step closer to finalization when members of the International Standards Organization (ISO) group that defined the framework recommended it be approved as a draft international standard in a recent meeting here.

According to ISO rules, if the recommendation is accepted by the group's secretariat, the so-called Open

Systems Interconnect Management Framework will move from the draft proposal phase to the draft international standard (DIS) phase. DIS status is one step away from full acceptance of a standard, and this status signifies a standard's stability, according to several participants in the standards process.

The framework is a conceptual model that describes how the interconnection between so-called "open" systems should be managed, including a specification of which net man-

### Open Systems Interconnect network management standards

OSI management framework	Development plan				
	1986	1987	1988	1989	1990
Common management information services and protocols	Draft proposal			Draft international standard	
				International standard	
Specific management information services and protocols	Configuration management, fault management, security management	Draft proposal	Draft international standard	International standard	
	Performance management, accounting management		Draft proposal	Draft international standard	International standard
Management information base		Draft proposal	Draft international standard	International standard	
Directory services	Draft proposal	Draft international standard	International standard		

SOURCE: HEWLETT-PACKARD CO., PALO ALTO, CALIF.

agement services should be provided and which protocols will be used.

"We have spent seven years defining what has to be accomplished by OSI net management and how,"

said Trudy Reusser, a standards engineer in the Information Networks Group of Hewlett-Packard Co. and founder of the network management committee.

According to Reusser,

the decision to push the network management framework along to DIS status comes about five months ahead of predictions for this step in the

See page 16

## DATA DIALOGUE

BY PAUL KORZENIOWSKI

### IBM/NET pact poses puzzles

The recent joint marketing and development agreement reached by IBM and Network Equipment Technologies, Inc. (NET) was seen as a major boost for the Redwood City, Calif., firm, which has rocketed from start-up company to one of the leading names in the communications industry.

The deal gave IBM nonexclusive, worldwide marketing rights for NET's IDNX line of T-1 multiplexers. Both firms refused to reveal the length of the agreement, but at first blush, the agreement looks like a match made in heaven.

IBM benefits because it had a glaring hole in its product line without a T-1 multiplexer. Big Blue customers have been moving to vendors such as NET, Timeplex, Inc. and Digital Communications Associates, Inc. to fill the void.

As part of the agreement, IBM will also be able to add NET communications protocols to existing products and develop new products that closely link the two companies' offerings. IBM may apply this part of the agreement to upgrade its front-end processors. Customers report the IBM 3725 front-end processor does not have enough horsepower to work with a T-1 line and quickly becomes a network bottleneck. IBM and NET should be able to solve that problem. A second development area would be the integration of

the IDNX more closely with Rolm CBX private branch exchanges.

With the agreement, IBM not only gave its stamp of approval to the T-1 multiplexer market but also to the fledgling 3-year-old company. In a competitive market, that approval could mean the difference between survival and starvation. IBM has the marketing might to move a great number of NET's products.

The agreement could have an immediate impact in the international arena. NET has been busily increasing the size of its domestic sales force and has tapped few foreign markets. Ellen Hancock, IBM vice-president and president of the Communication Products Division, said IBM plans to enhance the IDNX so it can better support international T-1 lines and will soon begin selling the IDNX through IBM international sales arms.

Lurking beneath the surface benefits of the agreement are some potential shortcomings that would be felt more sharply by NET than IBM. IBM should move many IDNX multiplexers, but that does not mean NET will reap substantial profits. Big Blue has the marketing muscle to demand large discounts from its OEM suppliers, and this agreement probably isn't any exception. NET quickly gained profitability by maintaining a high margin on

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## IBM INSIGHTS

**What's in a name anyway?** IBM has inadvertently created some confusion in naming one of its peer-to-peer networking capabilities. The confusion started when IBM published a document delineating a new communications scheme, dubbed Low Entry Networking (LEN), which enables devices such as a System/36 or a Series/1 to establish peer-to-peer sessions on a Systems Network Architecture network. Previously, SNA was hierarchical, and only a host could establish a session between two devices.

Devices in an SNA network fall into classes of so-called Physical Units, the most common being PU 2.0s. LEN works with IBM PU 2.1 devices, which are more intelligent than PU 2.0 devices. Thus, PU 2.1 has become synonymous with LEN. Clear enough, so far.

PU 2.1 devices can move messages only to a directly connected device. To free devices completely from networking host dependence, IBM added routing tables to certain PU 2.1 nodes, enabling them to route messages through a network. The added routing capability, which was announced only for the System/36, was labeled Advanced Peer-to-Peer Networking (APPN). At this point, things started to become a little murky.

Next, someone at IBM took a look at the PU acronym and decided it was not appropriate for Big Blue products. So, PU 2.1 devices were renamed to SNA Type 2.1 nodes. In conclusion, PU 2.1, LEN and SNA Type 2.1 are basically synonymous, and APPN builds on these capabilities.

Another item of confusion is which pieces of the new networking scheme are open. John Pickens, senior communications architect at Communications Solutions, Inc., a San Jose, Calif., consulting and software firm, noted that IBM has declared PU 2.1 an open architecture and published the specifications vendors need to develop PU 2.1-compatible products. However, the company has not made any statements or delineated any APPN specifications.

An IBM spokesman said the company is examining whether or not to declare APPN an open architecture. IBM appears to be a bit uncertain about how to proceed with APPN. Including true peer-to-peer networking capa-

See Insights page 16

## IBM/NET pact poses puzzles

continued from page 15

its products and will likely be hard-pressed to match those margins under any IBM agreement.

Historically, joint marketing agreements have been fraught with difficulties. A few years ago, General DataComm Industries, Inc. signed an OEM agreement with Cohesive Networks, Inc. On paper, the agreement looked as attractive as the NET/IBM deal. However, neither company was ever really satisfied with the agreement, which was terminated when Digital Communications Associates, Inc. purchased Cohesive last year.

One problem with joint marketing deals is that the two participating parties are usually more concerned with their own well-being than with the success of the agreement. Big Blue's interest in the NET deal is illustrated by the fact that the company did not include NET's low-end multiplexers in the joint marketing agreement because

they compete with IBM products. NET's aspirations can be seen in the company's continued commitment to establishing an international sales and distribution arm, rather than granting IBM exclusive sales rights.

Distribution problems could arise under the current arrangement. NET customers are IBM customers, including such companies as American Airlines, Inc. and Wells Fargo & Co. These users may find two sales forces with the same products calling on them, a situation that can be a trifle confusing.

In addition, NET announced in February a joint marketing agreement with Doelz Networks, Inc., which may even lead to a situation where three sales forces are besieging a single user.

Most importantly, NET may have handed over customer account control to IBM. By wooing many of the nation's largest communications users, NET positioned itself for rapid growth in the next few years. These customers obviously will add other items to their

networks. With NET T-1 multiplexers in place, many would have purchased other types of communications equipment from the company.

Last summer, NET purchased ComDesign, Inc. and added low-speed multiplexers to its product line. Bruce Smith, president of NET, said the company was looking to acquire other companies to round out its product line, a strategy hailed by many industry analysts.

It will be interesting to see if that strategy changes. IBM has long seen NET customers as its own and wants to control them. When IDNX customers need additional communications products, will they look to IBM or NET?

An NET spokesman said the company's goal is to let the customer decide which vendor to select. If they opt for Big Blue, NET may have to rethink its long-term strategy and decide if it wants to become a primary source of communications equipment or play second fiddle to IBM. □

## Insights from page 15

bilities in a hierarchical network is a tricky technical achievement. The company has been reticent about APPN and appears to be taking the better-safe-than-sorry approach before making it widely available.

**Let's hear it for more competition.** "Telecom/Eye Bee Em," a newsletter from International Resource Development, Inc. in Norwalk, Conn., reported that Ameritech plans to battle IBM on the communications software front. Last year, Ameritech purchased Applied Data Research, Inc., a Princeton, N.J., software company.

The report stemmed from remarks made earlier this year by Robert Barnett, president of Ameritech Enterprise Group, to a group of users in Amsterdam. Barnett said that, in addition to its data base software, Ameritech plans to offer software that improves local-area network, microcomputer-to-mainframe and departmental system communications. □

## Management standard near

continued from page 15

standards process. Reusser said she knows of no instance where a working group's DIS recommendation was turned down.

The OSI management framework is likely to become a standard in 1988.

How the framework will actually be implemented in products is defined in four additional standards components, all of which are at different stages in the OSI approval process.

"The purpose of the network management standards is to allow any vendor of network equipment to implement the standards and, by virtue of having done that, be able

to be a player in multivendor networking," Reusser said.

Standardization does not automatically mean vendors' products will work together, however. ISO does require that a standards proposal include conformance proposals before it is accepted as an international standard, according to Will Collins, principal engineer for Codex Corp. in Canton, Mass., and chairman of the ANSI XT35.4 committee on OSI management for the past three years. However, implementation of a standard is never specified.

The four components are known as common management information services (CMIS) and common management information protocol (CMIP); specific management information services; management

information base (MIB); and directory services.

CMIS is the vehicle for collecting information from and sending information to network nodes, according to Paul Brusil, group leader for network standards and performance at Mitre Corp. in Bedford, Mass.

CMIS has a set of service primitives for reporting and retrieving information, controlling the setting of parameters and initiating actions. CMIS will allow network managers to solicit network information, such as the value of a parameter, from a transport protocol layer, Brusil said.

And CMIS will provide the ability to transfer certain control commands, such as setting a retransmission timer or initiating a diagnostic test.

CMIS and CMIP are furthest along in the approval process. Both are currently in their second round as draft proposals, and these proposals were approved for balloting by ISO members at the Tokyo meeting, Reusser said. If approved, CMIS and CMIP will move on to the DIS stage, with full standard status likely in 1988.

CMIS and CMIP represent the protocols vendors need in order to implement the network management framework, Collins said.

In the event that the standards group is not able to draft an exhaustive set of services available in CMIS, it has left what Brusil called "placeholders" in the OSI management standards for specific management information services to be developed.

There are five categories of specific management information services, comprising configuration management, fault management, security management, performance management and accounting management.

Due to a lack of participants in the standards-making effort, the specific management information services are farthest from being

standardized, Collins said.

The third component of OSI management is the MIB. MIB "describes all the information that's needed in order to make management decisions," Brusil said.

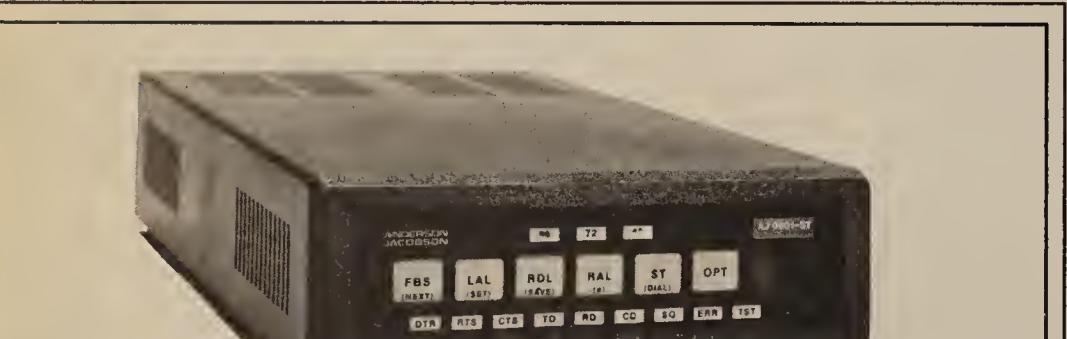
Some of this information resides within protocols and is transient, such as when a protocol layer counts the packets it is sending and the number of connections it has. Other information may be in historical archives of performance and accounting data, Brusil said.

Although ISO does not specify whether the MIB is centralized or decentralized, "in reality, it will be a totally distributed system," Brusil said. The MIB proposed standards are expected to enter the DIS stage sometime next year.

## Directory services

The fourth component of OSI management is directory services. These services are designed to manage naming information and the distribution of name-related information, such as the associations between logical names that network users might employ and actual networking addresses, Brusil said. Protocol layers and the range of network nodes — such as gateways, host computers and terminal servers — all have addresses.

In addition to being an ISO standard, directory services also falls under the purview of the Consultative Committee on International Telephony and Telegraphy, according to Hoyt L. Kesterson II, a consulting staff engineer for Honeywell, Inc., Bull Peripherals Corp., Phoenix Computer Products, Corp. and rapporteur for the directory services work group. As a result of that CCITT involvement, the directory services group is under pressure to produce a standard in time for the CCITT plenary session in 1988. Already in the works as a second draft proposal, directory services could reach the DIS stage by the end of this year, Kesterson said. □



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# LOCAL NETWORKING

## ► LOW-END NETS

# Users tepid on data switch

Early NetCommander users cite pros and cons of product.

BY PAULA MUSICH

Senior Editor

Software AG of North America, Inc. and Citicorp, two early users of Digital Products, Inc.'s NetCommander data switch, give the product mixed reviews for meeting their printer and modem-sharing needs.

Both firms chose the Watertown, Mass.-based company's low-cost data switch over other networking alternatives because they needed an inexpensive way to

share costly laser printers. Citicorp also selected NetCommander for its modem-sharing capabilities.

Data switches like NetCommander employ circuit-switching technology to move data over RS-232 or unshielded twisted-pair wire in a point-to-point manner at speeds up to 19.2K bit/sec. Because they cost less and are less sophisticated than other networking methods, they are used most often for simple device sharing and limited file transfer.

NetCommander provides periph-

“I think there are some people who believe TCP/IP is strictly a CAD/CAM, government or university solution. I think TCP/IP provides commercial end users with the capability of connecting a lot of different types of machines. If you've got DG, Prime, DEC, IBM [equipment] and a bunch of personal computers and you want to connect them all together, TCP/IP today is the only thing that will allow that to happen. I think it's a viable commercial alternative.

Michael Pliner

Chairman and chief executive officer  
Sytek, Inc.

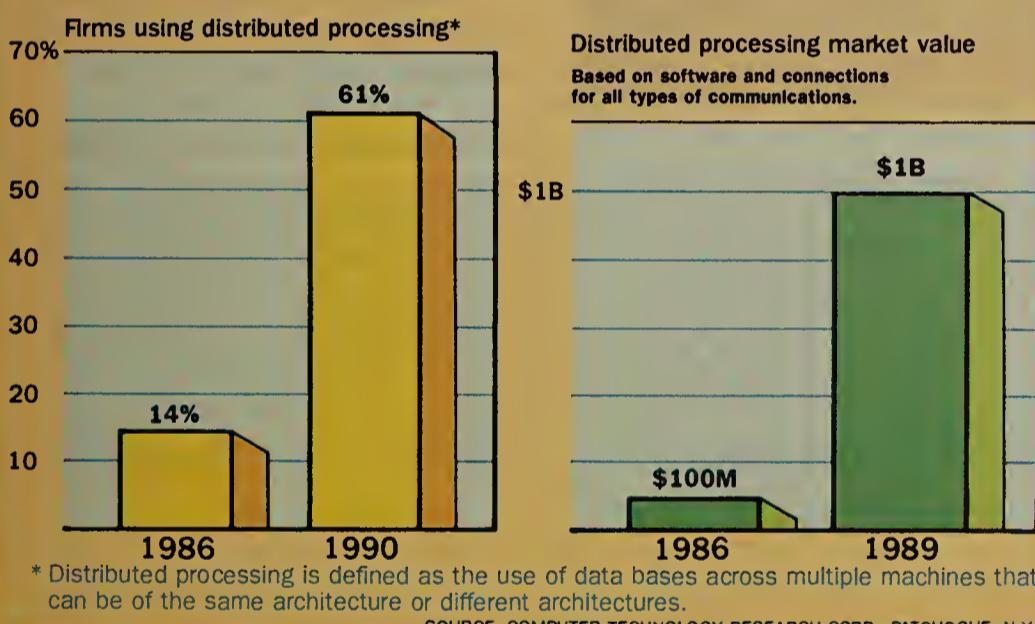
Software AG is using 25 NetCommander units primarily for printer sharing and some file-transfer functions at 22 locations around the country. Seligson estimated that 225 personal computer users are sharing 40 laser printers.

Because Citicorp Industrial Credit's Leveraged Financing Department wanted shared access to a central electronic mail system, modem sharing was an important feature. “Modem sharing was the determining factor for us, although cost did come into play as well,” said Al Gersbeck, senior systems officer at the Harrison, N.Y.-based financial services firm.

Citicorp users at nine different locations throughout the U.S. are using 35 NetCommander switches for sharing modems and printers.

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## Distributed processing in Fortune 500 firms



## NETWORK NOTES

Codenoll Technology Corp. of Yonkers, N.Y., and Standard Microsystems Corp. recently introduced a product that allows Attached Resource Computer Networks (ARCNET) to be implemented on fiber-optic cable at a cost said to be slightly higher than that of copper cable.

Codenet Fiber Optic ARCNET is a single card that plugs into an IBM Personal Computer or compatible and attaches directly to the fiber-optic cable. ARCNET is a baseband, token-passing local network technology that operates at 2.5M bit/sec. The fiber-optic network costs about \$700 per connection.

The Wollongong Group of Palo Alto, Calif., improved the performance of its Digital Equipment Corp.-compatible networking software and added several enhancements, including support for inter-

networking, subnet routing and Exterior Gateway Protocols for 12 different physical interfaces.

Release 3.0, which works on all DEC/VMS processors, adds support for primary and secondary domain name servers and an improved WIN/TCP mail system. The system supports distribution lists, use of nicknames and domain addressing.

Server Technology, Inc. of Sunnyvale, Calif., recently acquired data switch vendor Crosspoint Systems of Eugene, Ore. No value was placed on the acquisition.

Server Technology will bundle the Crosspoint line of data switches with its Easypoint software for a new family of products that allow IBM Personal Computers and compatibles or Personal System/2-class machines to share peripherals. Crosspoint will be a division of Server Technology. □

## LANMARKS

ERIC KILLORIN

# The Dark Ages vs. plug-and-play

The communications industry is progressive in many ways, but it's in the Dark Ages when it comes to standards.

If the home audio equipment market were like the local-area networking business, music lovers wouldn't be able to attach components from different manufacturers to achieve the sound they wanted. The electrical service supplied by utility companies would vary from house to house, making the plug-and-play world we enjoy today an impossibility. And imagine a favorite radio station operating at a different frequency with each radio manufacturer's equipment.

This nightmarish scenario is the reality of local network planners throughout the user community; their attempt to attach computers from different vendors is often solved with bulky protocol converters, costly gateways, the overhead of host intervention and endless lines of code needed to convert dissimilar file structures.

What's to be done? While there are several standards organizations working to achieve systems interoperability, the

Corporation for Open Systems (COS) has become one of the most visible. COS' objective is to accelerate the adoption of Open Systems Interconnect (OSI)-compliant protocols. Although many have given COS only lip service — just as with the International Standards Organization itself — COS is gaining momentum on the strength of more than 60 members.

These members have generated funding for testing and certification and have developed an aggressive campaign to show that ignorance of OSI isn't bliss. COS is an independent organization, and therein lies the strength of its checks and balances system; neither user nor vendor objectives are unduly catered to.

COS has worked with all seven layers of OSI and has established “platforms” on which various protocol specifications are grouped. There are low-priority and high-priority protocol suites within these platforms, and priorities are based on which protocols can solve the most problems and have the greatest support.

There are numerous specifications being considered for adoption in each layer, which in combination result in a protocol “stack.” A protocol stack

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Killorin is the publisher of “Netline,” an industry newsletter on computer networks, a publication of Hyatt Research Corp. in Andover, Mass.

## The Dark Ages vs. plug-and-play

continued from page 17

is a selection of interoperable layer specifications that provide end-to-end connectivity across the OSI model's spectrum.

A fully functioning layered architecture should have enough independence in the protocol stack to ensure compatibility with other architectures that use alternative interfaces. This is how multivendor communications will be achieved, since each vendor will adopt the protocol stacks most appropriate for its customers.

An interesting development in the upper layers of the platform concerns the Message Handling

System (MHS) protocols. MHS has widespread acceptance in Europe and is receiving attention here. It is a store-and-forward protocol for local network environments, allowing several interconnected computer systems to transfer messages among their users. The series of X.400 electronic mail specifications from the Consultative Committee on International Telephony and Telegraphy have been recommended for adoption as MHS-compliant protocols.

In promoting this electronic messaging standard, COS is faced with the momentum of the large installed base of non-OSI systems such as IBM's Systems Network Architecture and Digital Equipment Corp.'s Digital Network Ar-

chitecture (although DEC is moving much more rapidly away from DNA toward OSI compliance).

Other obstacles for COS are the inherent complexities of developing standards at each layer and the three- to five-year time frame associated with such a task. New local network schemes are also hitting the market regularly, and COS must be able to react.

Even after standards are established, the vendors' implementations must be policed to ensure compliance. In this vein, COS' work is not unlike the work that must be done in the U.S./Soviet talks for regulated nuclear arms; the two sides must obtain not only agreement but accountability and enforcement as well. □

## Users tepid on data switch

continued from page 17

Each location, equipped with a 16-port NetCommander, supports 12 personal computers, two printers and two modems.

Although printer sharing worked fine for both firms, modem sharing for the users at the Citicorp subsidiary fell flat. "Modem sharing is a problem," said Gersbeck. "It's very inconsistent. Sometimes the NetCommanders work; sometimes they don't. We haven't had any problems at our Cleveland office, but we've had all kinds of problems in L.A., and we haven't been able to figure out why."

The department has had to replace 15 of the switches to date. Because the switches failed under warranty, however, the replacements haven't cost Citicorp money — only time and a few headaches, according to Gersbeck.

The switches that had to be replaced would suddenly lose their configuration information for no apparent reason, Gersbeck said. "We'd reconfigure the switches, and two days later, the same problem would reoccur," he said. Configuration information is downloaded from attached personal

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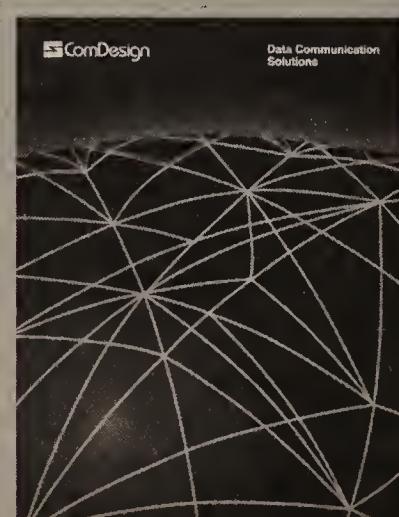
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Although printer sharing worked fine for both firms, modem sharing for the users at the Citicorp subsidiary fell flat. "Modem sharing is a problem," said Gersbeck. "It's very inconsistent. Sometimes the NetCommanders work; sometimes they don't. We can't figure out why."

computers into buffers in the switch.

Gersbeck also said that, occasionally, some of the switches would fail to disconnect a completed session, locking out access to a shared modem and ringing up access charges for the Telenet Communications Corp. network Citicorp uses for transmitting data.

Software AG has met with success using the switches for its applications, although the mainframe software vendor doesn't use the switches for communicating between its offices. "We already had a mainframe network with its own electronic mail program," said Seligson. "PCs were already connected to the mainframe."

Citicorp plans to install a new Micom Systems, Inc. switch that will perform the communications functions provided by the NetCommander.

Citicorp will continue to use its existing NetCommanders for printer sharing, but it won't buy any additional switches for that function.

Gersbeck said the combination of decreasing prices for laser printers and the cabling costs associated with installing the data switch have wiped out the cost advantage, making it more cost-effective to buy a printer for each user. □

# COMMUNICATIONS MANAGER

"The three information management functions — office automation, data processing and telecommunications — are being merged, with functional responsibility generally under the head of MIS. However, use of the title chief information officer is increasing."

Excerpt from a survey of 130 major U.S. companies  
Arthur D. Little, Inc.  
Cambridge, Mass.

## ► INTERVIEW

### GSA's Kreklow on management role

*Managers evolving to executive level.*

BY MICHAEL FAHEY

Senior Writer

SEATTLE — In his 30 years working in telecommunications, Rebel Kreklow has seen the role of the communications manager evolve from tool-carrying technician to executive-level administrator.

"The image of the communications manager is changing. We are being recognized as business managers," said Kreklow, who is chief of telecommunications for the U.S. General Services Administration's four-state Pacific Zone North.

But communications managers have to improve upper management's perception of their role fur-

ther, Kreklow said. "We have to be better trained in terms of financial management, decision-making and personnel issues."

Kreklow and his 25-person staff provide telecommunications services for nearly all of the federal agencies in Alaska, Washington, Idaho and Oregon. They are responsible for 28 telephone systems serving some 1,600 federal offices throughout the four-state area.

Kreklow said communications managers must be better informed about their organization's business goals. "In order to serve our companies and agencies better, we must understand the organization's purpose and how it functions," he said. "It is incumbent on



Rebel Kreklow

the communications manager to show upper management what can be done with communications to further the goals of the organization. But we can't do this without being familiar with its structure and purpose."

To accomplish this, Kreklow meets regularly with the administrators and users from the federal

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## ► MEMBERSHIP DRIVE

### COS signs DOD group and Nynex

*DCA, BOC become senior members.*

BY KARYL SCOTT

Washington, D.C. Correspondent

MCLEAN, Va. — The Corporation for Open Systems (COS) said last week the Defense Communications Agency (DCA) and Nynex Corp. have joined COS as senior research members, making them the first federal agency and Bell operating company, respectively, to sign on with the communications consortium.

Adding one of the largest government users and a major communications carrier to the senior ranks of COS is a coup for the 1-year-old standards-testing organization and represents the fruition of months of negotiations.

COS is a nonprofit research and development consortium comprising 67 communications users and vendors. COS' mission is to identify, implement and test Open Systems Interconnect (OSI) protocol standards and drive the development of OSI-based products.

The Office of Management and Budget (OMB), which is responsible for the development of a governmentwide OSI implementation policy, last week endorsed DCA membership in COS. According to OMB, DCA will represent all users within the defense community at COS.

OMB also directed the National Bureau of Standards (NBS) of the Department of Commerce last week to join COS on behalf of all civilian agencies. NBS has not as yet joined.

As senior members, both DCA and Nynex will pay an annual membership fee of \$200,000. Senior membership status gives members the greatest participation in various COS activities and the greatest influence over policy development.

As senior members, DCA and Nynex will be allowed to have representatives on five technical subcommittees, participate in the Strategy Forum — the policy setting arm of COS — and have direct input to the board of directors, said Ted Manakas, COS information products manager in charge of recruitment.

Senior membership status is the  
See page 21

## GUIDELINES

JIM MORGAN

### Debugging systems' people problems

Too often, people attribute communications system failures to technical failures, when they are actually the result of people problems.

Problems incurred at the cut-over of a new telecommunications system, for example, may be blamed on faulty programming or intermittent hardware failures. But the real cause of the problem may be due to cutting corners on user and maintenance staff training; that is, people problems.

In another example, a private branch exchange or local network that experiences excessive downtime due to component failure may be out of service longer than necessary because the telecommunications staff was never taught how to swap out failed components. Or the problem might stem from a lack of spare parts due to management penny-pinching. Or the vendor's maintenance staff might have arrived with the wrong test equipment. All these are people problems.

Morgan is head of J.H. Morgan Consultants, a Morristown, N.J., company that provides telecommunications management and technical consulting.

This phenomenon exists because it is often easier to blame equipment for communications problems than to blame people. Upper management is more receptive to equipment problems than to people problems. But the problems will continue until com-

Problems incurred at the cut-over of a new telecommunications system, for example, may be blamed on faulty programming or hardware failures. But the real cause may be due to cutting corners on user and maintenance staff training; that is, people problems.

petent managers see a pattern and identify the real problems.

Technically competent people unfortunately tend to look for technical solutions to problems because that is their area of expertise. They force-fit solutions using the technical knowledge with which they are comfortable. Too many wear technical blinders.

In today's fast-changing com-

munications environment, we must take a broad-based problem-solving approach, considering both people and technology as potential culprits when breakdowns happen. Of course, true technical problems do occur. Components fail; design limits are exceeded; intermittent faults happen; software bugs occur, and weak designs are produced. Telecom people must indeed maintain their technical expertise. But their efficiency suffers when they constantly resort to a narrow technical approach to solving problems.

How can communications managers expand their troubleshooting to include people-related problems? Where will they get the time for understanding their users? The answer is that they have more time to solve the truly technical problems once they recognize the people problems.

In order to sensitize themselves to the issues that lead to human rather than technical problems, communications managers must make an up-front time investment. The effort is worth it. The payoff in correctly diagnosing people problems comes in increased time to devote to true technical problems. □

## DIALOGUE

Have the product announcements IBM has made in the last year made its communications strategy any clearer?

"I don't think they have clarified IBM's strategy very much. It seems that half of their products aren't available, and the ones that are available aren't necessarily fully developed.

I just hope they have a clear picture of what they are going to do. I do suppose it's a little clearer than it was in the past, but it seems they have so many things out there now, it's difficult to make a proper choice. We're an IBM shop, so there's hope that we could utilize some of the products, but it is difficult to decide which ones.

**Robin Fromm**  
Communications specialist  
Detroit Ball Bearing Co. of Michigan  
Detroit

"I think the product announcements they've come out with in the past three or four weeks have sounded very good, and they're definitely making the competition and users think twice about buying the equipment. We just went ahead and bought a lot of DEC equipment, but people I've talked with say that down the road they will move back to IBM equipment.

**John Winn**  
Communications analyst  
Electronic Data Systems Corp.  
Southfield, Mich.

"IBM's strategy is far from clearer. It's muddled, especially when it comes to SNA, which used to be a very well-defined host-to-peer network. Now you have host-to-peer and peer-to-peer; it's not clearly defined. The equipment announcements are benign, in my opinion, because other manufacturers have already been there.

There isn't really anything innovative or new. There has been some integration of IBM and non-IBM equipment. However, in that integration, they are also forcing you to use the newer technology.

**Walter Southwell**  
Telecom analyst/hardware specialist  
Farm Credit Banks  
Irmo, S.C.

"Our company was very pleased to receive the announcements, especially the ones on NetView and Rolmbridge. From the input I've gotten from other people in communications at Fidelity, they are very excited and they are passing along all the information to the various departments because they know it's going to have an impact on us.

**Carmelo Pagan**  
Communications analyst  
Fidelity Investments  
New York

— SNA becoming available to others — but we're wondering about LU 6.2; that's still unclear.

**Mike Espenshade**

Senior telecommunications analyst  
Hershey Chocolate Co.  
Hershey, Pa.

"As far as networking is concerned, I haven't seen anything earth-shattering yet. The products are not out, and they are all promises so far.

**Aaron Greenberg**

Telecommunications project manager  
Information Systems and Networks, Inc.  
Bethesda, Md.

"I don't think it's made their strategy any clearer. It is still muddled. I think they are, indeed, trying to conform more to what the rest of the industry is doing, but their particular position at this point is not as clear as it could be. I believe they are headed toward more connectivity with other vendors. But, I'm not sure how they are going to do that.

**Richard Lilly**

Data communications manager  
Interstate Electronics Corp.  
Anaheim, Calif.

"I think it made it clear that IBM is putting a lot more emphasis on communications. They announce products and then don't make them available until Novem-

ber. I'm always skeptical about their announcements, because it seems they preannounce things. They announce [Systems Application Architecture] and it's not going to be available for months and months and then a year.

**Jerry Moloney**

Senior communications analyst  
John Hancock Mutual Life Insurance Co.  
Boston

"I go back a long way with IBM, and I am not skeptical. They are pretty reliable. Until they make a total commitment to SNA, I'm not sure where they're going to go.

**David Gray**

Data communications specialist  
International Revenue Service  
Detroit

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"There wasn't anything superimpressive. We weren't impressed with any strategic direction changes, but I think it has a lot to do with what was interesting to us also. We're excited to see IBM relaxing their proprietary standards

## GSA's Kreklow on management

continued from page 19

agencies for whom his department provides telecommunications services.

"We have periodic visits with the agency heads and their telecommunications coordinators," he said. "We have users groups in Anchorage, Boise, Portland, Seattle and Spokane, and we meet with them quarterly."

Kreklow said that although he works for the federal government, he is confronted with the same constraints and opportunities as his colleagues working in the private sector.

The rapid changes in communica-

cations technology and the uncertainties wrought by divestiture have complicated the duties of all communications managers, said Kreklow, who began his career with the federal government as a teletype operator.

"There are more options, and the decisions are becoming more difficult. Things like the cost of money and depreciation schedules are becoming as important as technical issues," he said.

Furthermore, Kreklow said, as communications managers take a more active role in their organizations' overall management, writing and public speaking skills become essential.

"Sometimes the so-called expert is just the person with the best

slide presentation," Kreklow said.

Because the role of the communications manager is changing, Kreklow said, people entering the profession are likely to be products of college- and graduate-level communications management programs. "We are starting to see people with degrees," he said. "Two of my area managers have associate's degrees in telecommunications, and I think it has helped them in their work."

Kreklow, whose first experience with communications came when he enlisted in the Air Force following high school, has taken many courses at local colleges and universities, and he is hoping to earn a bachelor's degree in telecommunications. □

## COS signs DOD group and Nynex

continued from page 19

highest level of participation in COS.

DCA participation in COS' OSI testing work is especially crucial in light of COS' recent drive to attract more user members. The addition of DCA brings the number of users in COS to 18.

"Users are a priority group for COS due to their valuable practical input to our mission," said COS President Lincoln Faurer. "Their experience enhances the research we conduct and adds the perspective of market viability," Faurer said.

DCA officials declined to comment on their specific reasons for joining COS. However, DCA spokesman Major H.R. Hock did say, "DCA hopes to work closely with vendors and other users on the adoption and implementation of OSI and other communications standards."

One of DCA's top priorities is expected to be the implementation of OSI network security standards. "We expect DCA to contribute their expertise in this area and drive the development of security standards that will benefit government as well as private sector users," Manakas said.

Nynex's decision to join COS was approved by its board of directors last week, signaling what could be a trend of RBHC participation in the communications consortium.

Officials at COS have been trying to enlist RBHC membership for some time.

"We felt the time was right to join," said Nynex spokesman Joseph Gagan. "It's an important organization that will be influential in the development of key computer and communications standards in the years to come," he said.

Bell Atlantic Corp. officials, who recently attended a COS strategy forum, agreed with Nynex's sentiments, but decided not to join COS at this time.

"We strongly support the work of COS and feel it is very close to what we are doing in the open systems arena, but we don't have the financial or human resources to commit to COS," said Roger Nucho, district manager for standards and technical requirements at Bell Atlantic.

Nucho did not rule out the possibility of joining COS at some later date. Another major user considering membership is American Express Co., which is weighing the cost/benefit question. "We're very interested in technology such as OSI that will help us move into the future and help us sell our products," said Eileen Bell, manager of International Transaction Services. "We just have to decide whether we can afford the \$25,000 user membership fee."

The DCA's \$200,000 senior membership gives the agency a greater degree of participation and control over policy than the membership type that American is considering. □

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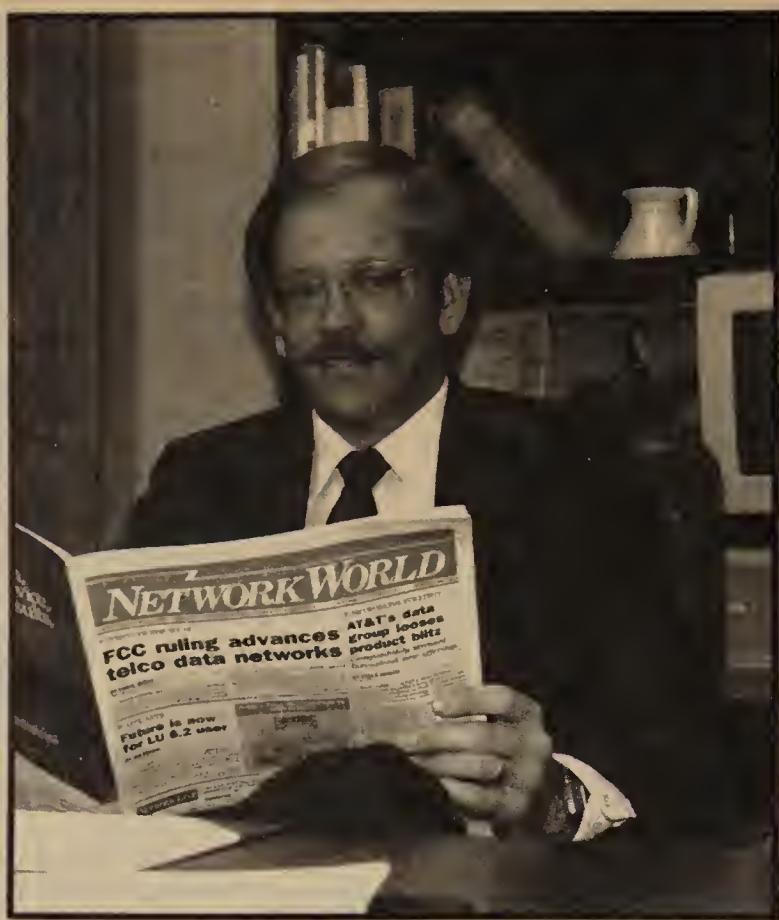
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**R**obert Stark is Manager of Network Operations for Litton Industries of Beverly Hills, California. He supervises the company's voice network analysts as well as those analysts who provide telecommunications consulting services to Litton divisions.

In this position, he is also charged with establishing specifications and making recommendations for the purchase of network communications equipment. And in order to carry out these responsibilities, Robert turns to *Network World*.

“Reading *Network World* definitely helps me in my job. I get crucial information about the viability of certain vendors, which lets me know if I should enter a business relationship with long-term expectations. In my job I’m looking for vendors who take a systems approach to networking. And I find them in *Network World*, which covers networking from a systems point of view.

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# NEW PRODUCTS AND SERVICES

## ► NATIONAL COMPUTER CONFERENCE

### DSC, GTE gear debuts at NCC

Product unveilings brighten slow show.

BY JOSH GONZE

Staff Writer

CHICAGO — A few networking gems announced at the National Computer Conference (NCC) here recently helped brighten the pall cast by poor attendance at this year's downsized edition of the once-towering computer show.

Two subsidiaries of central-office switch maker DSC Communications Corp. announced products the company hopes will help it advance into the private network market. DSC Nestar Systems, Inc., the company's local net subsidiary, unveiled a set of token-ring and ARCnet products at a press conference. Concurrently, Granger Associates, Inc., a subsidiary that makes telecommunications gear, announced an enhanced T-1 multiplexer called the CP2000 Digital Network Access System.

The Nestar local-area network

products include three new servers, an intelligent network interface card (INIC) with a built-in coprocessor and an X.25 gateway that lets up to 32 workstations concurrently access public data networks.

Two of the new file servers, the Planstar Models 1 and 2, will eventually replace Nestar's older desktop file server, Plan 3000. The Model 1, priced at \$6,700, offers an 80M-byte disk drive and a 60M-byte tape drive, while the Model 2, which costs \$9,600, offers 150M bytes of each. Both will be available in September. Nestar continues to offer a high-capacity file server called the Plan 5000.

A new asynchronous communications server, the Planstar ACS, is compatible with ARCnet and IBM Token-Ring networks, manages up to 16 modems and handles speeds up to 19.2K bit/sec. It is available immediately in eight- or 16-port

versions. The eight-port version is priced at \$6,000.

The INIC network interface board is IBM Token-Ring Network-compatible and enables IBM Personal Computer XTs and ATs to access a Nestar file server. The on-board coprocessor frees the computer's power for other uses and speeds up processing. It is priced at \$595 and will be available in September.

Enhancements to the Granger CP2000 Digital Network Access System multiplexer included increasing the number of T-1 interfaces from six to 20 and the number of DS0 channels from 72 to 240. The expansion was made possible by increasing the number of option card slots from eight to 12 and adding a slave shelf with room for 16 more option cards. Granger also made common equipment redundant to make the whole box largely fault-tolerant, according to division manager Donald Skipwith. Common equipment includes the power supply, system processors and cross-control matrices.

In one of the few other communications announcements, GTE Spacenet Corp. debuted a network management system and a point-to-point data service designed to strengthen its Skystar family of very small aperture terminal satellite communications services.

Skystar's new net management system is based on gear GTE Spacenet calls universal protocol cards, which monitor individual communications circuits and allow reconfiguration of remote terminal equipment. The cards support asynchronous and synchronous protocols and a variety of interfaces approved by the Electronic Industries Association and the Consultative Committee on International Telephony and Telegraphy. Configuration control takes place at the user's site and allows permanent, switched or application-assigned routing for optimization of transmission paths, according to the company.

The McLean, Va.-based company previously offered a more limited monitor and control capability with the Skystar service.

The new system does report-generation, providing data on performance of stations, lines and protocol cards. Statistics are arranged hourly, daily and monthly. An audit file of all network events is stored. The system is Unix-based and, according to GTE Spacenet, can interface with Unix-based local-area networks.

The new point-to-point service, which costs \$1,700 per month, uses the same Ku-band frequencies and provides the same 56K bit/sec transmission speed as the company's multipoint service. □

See inside for:

- OAZ PC-to-facsimile add-on board
- Fox twisted-pair LAN
- PCC's PROFSlink package

## ► PC EMULATION

### Quicklink networks ASCII CRTs

BY JIM BROWN

New Products Editor

COSTA MESA, Calif. — The Network Link recently introduced an IBM Personal Computer-compatible board that enables a connected ASCII terminal to act like a network-connected personal computer.

QuickLink plugs into the host personal computer's expansion slot and supports an ASCII terminal over twisted-pair wire, RS-232 or RS-422 cable. The terminal can then be used with a personal computer keyboard to run MS-DOS applications. QuickLink is based on an Intel Corp. 8086-compatible NEC V-40 microprocessor with 640K bytes of random-access memory.

With a personal computer expansion chassis and an additional 16M bytes of cache memory, the host personal computer can support up to 51 QuickLink boards. In effect, the product allows companies to turn their existing ASCII terminals into local network-connected diskless personal computers.

Each QuickLink board also provides two personal computer communications ports that support attachment from the terminal to a printer and a modem. The firm claims several host personal computers can be linked to expand the QuickLink network capacity beyond 51 devices.

In addition to hosting the QuickLink boards, the host personal computer can be made into a file server by running Novell, Inc.'s Netware/86 or Netware/286 local network operating system. That software allows the connected terminals to share data, resources and applications and exchange electronic mail.

The firm claims the QuickLink product will support interface cards that provide a gateway to other local nets. It also reportedly supports most other communications server offerings, including mainframe gateway products.

Each QuickLink board is priced at \$1,095. The boards are manufactured for The Network Link by InterContinental Micro Systems Corp. of Anaheim, Calif.

The Network Link is located at 3303 Harbor Blvd., Building H-10, Costa Mesa, Calif. 92626, or call (714) 549-9380. □

## ► VOICE MESSAGING

### Voice response units debut at Audiotex

BY JIM BROWN

New Products Editor

NEW YORK — A pair of telephone voice response systems and software that assists users in developing voice response applications were introduced at the recent Audiotex Industry Conference and Exhibition here.

Dallas-based Teknekron Infoswitch Corp. and Los Gatos, Calif.-based Vynet Corp. both released new voice response systems at the show. The systems are designed to guide callers through voice applications and to collect and retrieve data. Any information collected can be stored as voice messages, or it can be passed on to computer data bases.

VMX, Inc. of Dallas and Digital Sound Corp. of Santa Barbara, Calif., also used the show to release software that supports development of customized menu options that guide callers

through voice applications.

Voice response systems answer incoming calls with prerecorded voice messages that prompt callers to enter spoken commands or key in commands using their push-button telephones to enter or retrieve data from a computer. Primary applications include retrieving bank account balances, transferring funds between bank accounts, validating credit cards, entering purchase orders and obtaining airline flight information.

Teknekron Infoswitch's Voice Response Unit (VRU) supports up to 32 voice channels. In addition to recognizing digits entered from a key pad, the Intel Corp. 80286 microprocessor-based product will recognize the spoken digits zero through nine as well as the words yes and no. The VRU will provide a link between voice applications and a host computer data base by

See page 24

## First Look

### Board serves as facsimile, modem, scanner interface

**OAZ Communications, Inc.** introduced an IBM Personal Computer add-on board that provides personal computer-to-facsimile transmission, an integral modem and a document scanner interface.

The Xafax board uses an Intel Corp. 80188 microprocessor with 512K bytes of random-access memory, and it can plug into a personal computer connected to a Winchester hard disk and a floppy disk drive.

The board is also outfitted with a 9.6K bit/sec facsimile modem, a Hayes Microcomputer Products, Inc.-compatible 1,200 bit/sec modem and a small computer system interface that will support connection of an image scanner to the personal computer.

Running in the background while other DOS applications are being executed, the Xafax board features its own multitasking operating system. It will simultaneously retrieve an image from a disk, send a facsimile document and pass a message to the personal computer's host processor for display. The board also performs all the compression and decompression of both image and data as well as several communications functions.

The Xafax board will automatically receive incoming messages and facsimile documents and flash an alert on the user's screen. The message or facsimile document is buffered in the coprocessor's memory and will automatically be com-

pressed and stored as a disk file if the user does not respond after a specified time. The board's RAM typically holds eight pages.

The Xafax board costs \$1,159. **OAZ Communications, Inc.**, 15032 C Redhill Ave., Tustin, Calif. 92680, or call (714) 259-0909.

### Enhanced version of twisted-pair local net

**Fox Research, Inc.** released an enhanced version of its twisted-pair wired local-area network and a repeater that enables users to connect the firm's bus and star network topologies together.

The firm's **10-Net** Version 4.0 adds support for the server message block protocols used in Microsoft Corp.'s MS-Net local-area network software and provides interfaces to IBM's Network Basic I/O System. The new version also adds windowing support for the package's Chat and Systems Monitor features. It retains support for such 10-Net features as menu-driven security, network management tools, news, calendar, print spooling and remote job submission.

The 10-Net repeater is designed to link a bus-configured 10-Net local net with a star-configured 10-Net local net in order to extend the overall distance of a 10-Net beyond 2,000 ft. The unit also features an optional add-on interface for connecting to a fiber-optic cabled 10-Net local net.

Bundled with the firm's 10-Net StarLAN board, the 10-Net Version 4.0 will be available in September for \$695 per connection. The as yet unpriced 10-Net repeater is scheduled for shipment in September.

*Fox Research, Inc., 7016 Corpo-*

rate Way, Dayton, Ohio 45459, or call (513) 433-2238.

### Package links cc:Mail to IBM's PROFS

**PCC Systems, Inc.** released a gateway that allows users of its local-area network-based electronic mail package to exchange E-mail messages and files with users of IBM's mainframe-based Professional Office System (PROFS).

PCC Systems' cc:Mail PROFS-link runs in conjunction with the firm's cc:Mail LAN and cc:Mail Gateway Version 1.4 packages. It can be configured to provide an automatic connection between any local net and an IBM mainframe running PROFS. In order to link cc:Mail Gateway to the mainframe, the user must provide a Hayes Microcomputer Products, Inc.-compatible 2,400 bit/sec modem.

Users of personal computers attached to a local net would address an E-mail message and attached DOS file destined for a PROFS user as if the message were to be delivered to another cc:Mail user. PROFS-link automatically converts the cc:Mail message to a PROFS note, and the DOS file is spooled to the recipient's PROFS reader file. It then connects to PROFS, delivers the message and picks up any messages waiting to be delivered to cc:Mail users. cc:Mail PROFS-link will also convert PROFS messages and IBM's Conversational Monitor System files for delivery to cc:Mail users.

Available in August, PROFS-link costs \$995.

**PCC Systems, Inc.**, Suite 201, 480 California Ave., Palo Alto, Calif. 94306, or call (415) 321-0430.

### Mainframe-based telecommunications

The **Cincinnati Bell Information Systems, Inc.**'s Communications Management Systems Division recently announced a modular, mainframe-based software system designed to manage private telecommunications networks.

The Communications Management System (CMS) offers nine software modules that can be used separately or together. A master module provides security and coordinates interactions between modules. Other modules support such functions as call accounting and traffic analysis, equipment inventory, work- and service-order tracking, cable records management, on-line call record inquiry, trouble reporting, on-line directory and a message center.

The package will work on IBM mainframes as a CICS application under MVS. The system will support IBM's 3270 data stream and 3270-type interactive terminals. According to the firm, the software system will support as many call records, telephone stations, inventory items and nodes in a network as can be supported on the mainframe. However, in order to be cost-effective, this system should be used to manage telecommunications networks with more than 200 extensions, and it is being aimed at firms that support about 1,000 extensions.

The cost of CMS software modules ranges from \$10,000 to \$65,000 per module. CMS's entire line will be available in 1988.

**Communications Management Systems Division, Cincinnati Bell Information Systems, Inc.**, 1500 Planning Research Drive, McLean, Va. 22102; call (703) 556-2300. □

## Voice response units debut

continued from page 23

making the voice response system appear to an IBM host as either an IBM 3270 or 5250 terminal.

Data collected as telephone key pad digits or spoken commands is presented to a host computer, which will retrieve needed data and pass it back to the VRU. The VRU will convert the data to speech and read it to the caller. According to the firm, the device will support IBM's Binary Synchronous Communications or Synchronous Data Link Control protocols as well as Burroughs Corp.'s Poll>Select, NCR Corp.'s Polled Terminal Emulation and TTY protocols.

The new product has a menu-driven application development language and is reportedly compatible with all private branch exchanges, Centrex services and trunk types. It can also work with the firm's ACD86 automatic call distributor.

Featuring two hours of voice storage, the firm's VRU is housed in an IBM Personal Computer-like cabinet and priced between \$37,000 and \$85,000. That price also includes a display monitor, keyboard and hard disk.

Vynet Corp. used the show to introduce an IBM Personal Computer AT-based voice response system and application development software. The V4000 system supports as many as 48 voice channels and up to 60 hours of voice storage.

The V4000 system uses Vynet's proprietary VOS4000 Voice Operating System. That software supports menu-driven utilities that allow users to write, digitize and edit

Data collected as telephone key pad digits or spoken commands is presented to a host computer, which will retrieve needed data and pass it back to the VRU. The VRU will convert the data to speech and read it to the caller.

voice applications. It will also support its own data base for stand-alone applications. In addition, the software will interface to other local or remote computer system data bases over standard RS-232- or IBM 3270-type communications links supporting IBM's SDLC.

Vynet's system also allows callers to enter key pad digits in response to voice prompts, access computer data or leave a voice message. Vynet's new offering works with a PBX and automatic call distributor.

Supplied with a keyboard, display monitor, a 60M-byte streaming tape drive and choice of hard disk drives that support between 12 and 60 hours of digitized voice storage, the V4000 is priced in the range of \$75,000.

Vynet also introduced the \$2,500 Voice Application Software Tool (VAST) that allows users to develop voice response applications. Layered on top of Vynet's

Voice Operating System, the package can be used with Vynet's VASTCOM and VAST3270 software to support RS-232- or 3270-type connections between the V4000 and a host computer.

VMX released InfoLink, software designed to allow its Voice Messaging Exchange to give callers a list of up to nine options that will route them to other applications, including data entry and data retrieval. With the \$3,000 InfoLink, a caller will hear a prerecorded greeting followed by a list of up to

nine options, any of which can be chosen by pushing a key pad digit. The caller can be presented with up to 12 lists of nine options each.

For example, InfoLink can be used to relay interest rate information on a variety of loan offerings or savings plans. A caller would be asked to enter a 1 to get loan interest rate quotes or a 2 to get savings plan interest rate quotes.

A list of up to nine different loan or savings options can then be listed. The caller could retrieve information on any of them by pressing the corresponding key pad digit. Another list of up to nine options could then be presented to the caller, including the option to transfer out of InfoLink to an operator or to a voice mailbox.

Digital Sound's VoiceForms software is designed to allow the firm's VoiceServer System to support survey- or questionnaire-type applications. During a VoiceForms application, a caller would enter key pad numbers or spoken answers in response to prerecorded questions. That data would be collected and stored on disk until it can be transcribed.

Up to 50 different VoiceForm applications can be supported by the VoiceServer. The package costs \$4,000. □

# As networking takes over the world, Network World takes over the market.

The trend has never been clearer. Networking is now the major application market for communications. And a recent statement by Ken Olsen, President and Founder of Digital Equipment Corporation, substantiates this trend: "We have to start thinking of the computers as peripherals. You start with the network, then you hang the computers on later."

Networking. It's been *Network World's* focus from the very start.

In fact, it is the *only* publication that covers the entire realm of communications from the networking point of view. And in doing so, *Network World* has established itself as the *standard* for communications users already networked or planning to network.

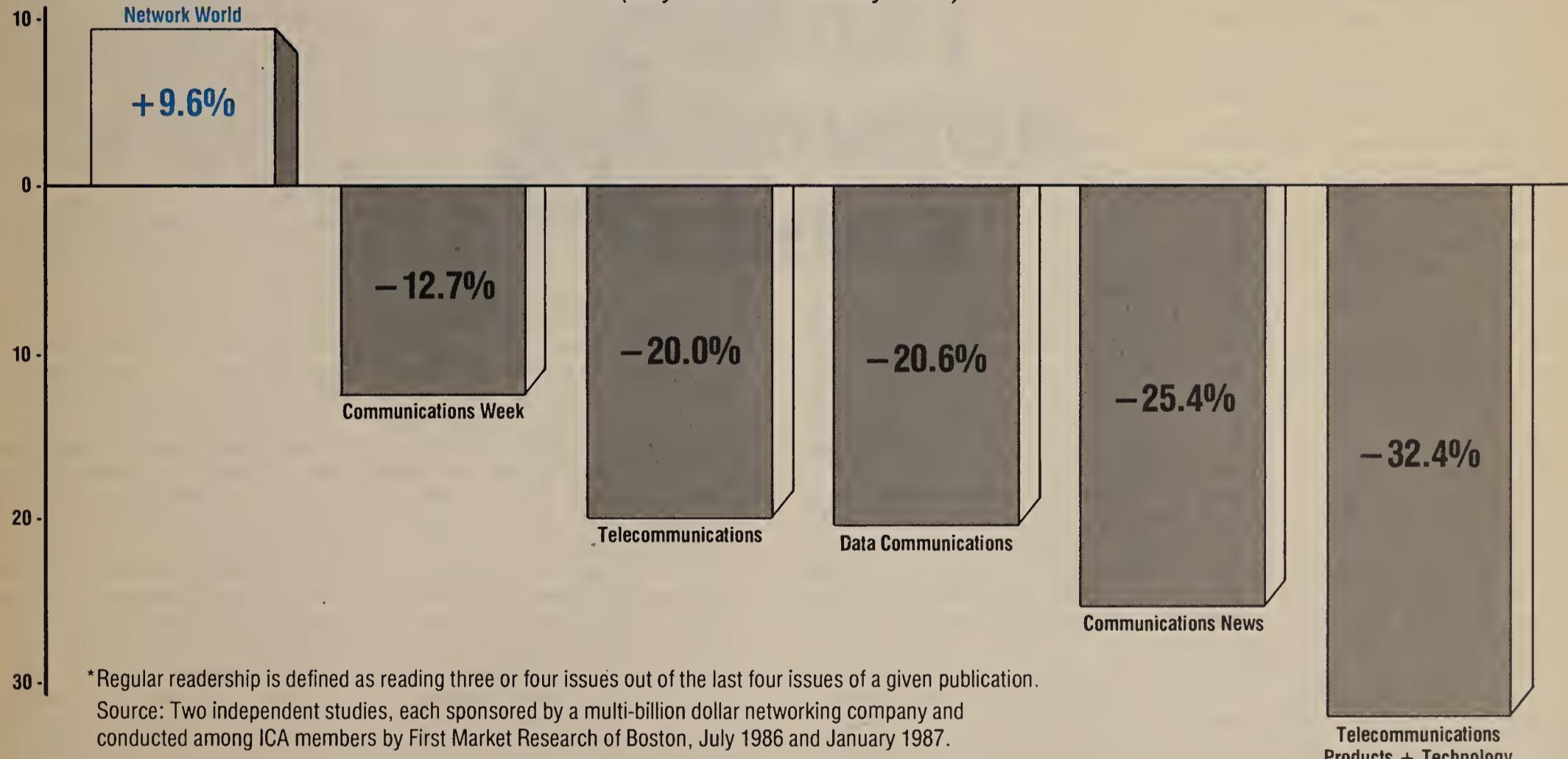
Today's users know they need up-to-date information in order to keep pace with the evolving world of networking. That's why they read *Network World*. And that's

why *Network World* was the only publication to gain in regular readership in an independent study conducted among ICA (International Communications Association) members, some of the nation's most influential buying decision-makers for voice and data communications products and services.

The study, sponsored by a multi-billion dollar networking company and conducted in January 1987 by

First Market Research of Boston, showed decreased readership of all communications oriented publications among ICA members since a previous study in July 1986. Only *Network World*, with its exclusive networking-oriented coverage, experienced an increase in regular readership. The percentage increase/decrease for each publication over that six-month period is displayed in the following chart.

Percentage Change in Regular Readership\* among ICA Members  
(July 1986 vs. January 1987)



\*Regular readership is defined as reading three or four issues out of the last four issues of a given publication.

Source: Two independent studies, each sponsored by a multi-billion dollar networking company and conducted among ICA members by First Market Research of Boston, July 1986 and January 1987.

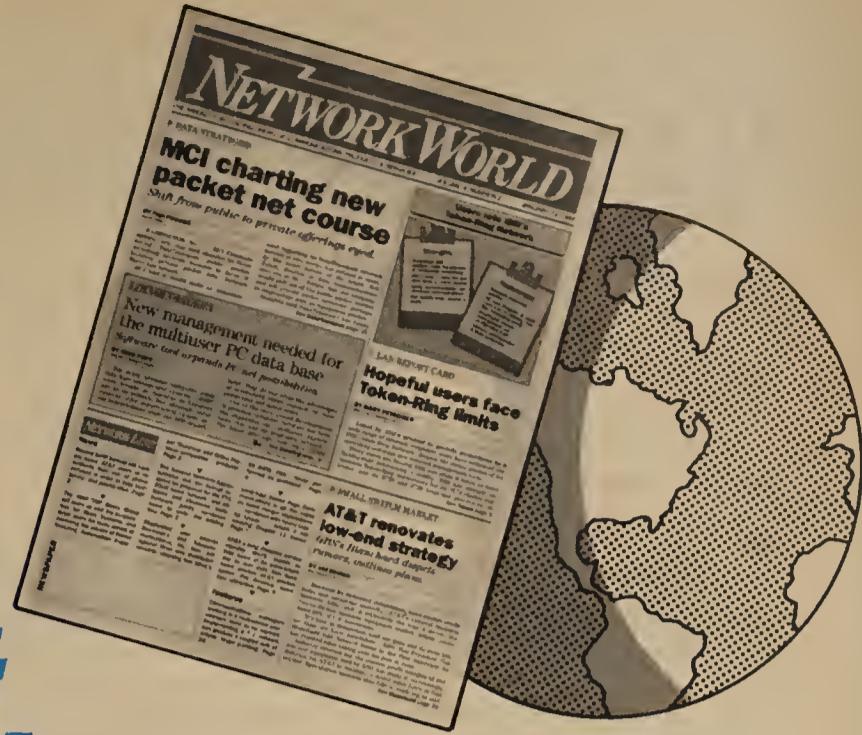
Because networking is your business, we've made it our business. No other publication looks at the world of networking like we do. Today the network is the market - and the market reads *Network World*.

## NETWORK WORLD

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# Opinions

Digital Equipment Corp. President Ken Olsen recently set off fireworks by saying that in manufacturing automation, Ethernet (IEEE 802.3) is a

practical alternative to the Manufacturing Automation Protocol broadband token bus (IEEE 802.4).

However, both MAP and Ethernet are too valuable to pit against each other in the kind of win-or-lose fire storm that sells newspapers but does little to advance manufacturing automation.

Let's not return to the fanaticism that ruled IEEE Project 802 back in 1982. Instead, let's reposition MAP to be independent of the transmission media. Let's also consider using Ethernet, now by far the most widely installed local-area network technology, as an alternative to the broadband token bus in some manufacturing automation applications.

The General Motors Corp.-led MAP team bit off more than it could chew when it took on three major standardization projects. Not only did it take on the problem of establishing standards for MAP, it also assumed the problems of perfecting communications transport, or Open Systems Interconnect (OSI), standards and establishing standards for untried broadband token bus local-area network technology.

To the MAP team's credit, there are now some manufacturing automation protocols. MAP also got off to a good start by recommending use of emerging OSI protocols, instead of starting from scratch on transport. However, the MAP team headed down the wrong road when it based its work on broadband token-bus technology.

Two mistakes were made. First, well-structured networking architectures should be independent of transmission media. The current MAP is not. Second, MAP chose the wrong medium. The second problem would be solved almost automatically if the first is fixed.

From its earliest days, MAP chose the broadband token bus for its local-area net transmission medium. This was back when IEEE Project 802 was struggling to find a compromise between Ethernet — proposed originally by DEC, Intel Corp. and Xerox Corp. — and the Token-Ring Network, which IBM later proposed.

The broadband token bus (IEEE 802.4) was designed to

*Metcalfe, chairman of Santa Clara, Calif.-based 3Com Corp., invented Ethernet at the Xerox Palo Alto Research Center in the early 1970s. He also serves on the executive committee of the Corporation for Open Systems.*

## PRO:

BY ROBERT M. METCALFE

Special to Network World

combine and improve upon the best features of both — bus from Ethernet and token from ring — with the addition of broadband that neither had.

How wonderful it sounded then. The problem was that this technology did not then exist and, as happens to most untried technologies, it was oversold using invalid arguments that still reverberate around the industry.

Many people still assume that because Ethernet is baseband, it is susceptible to electronic noise in the factory. Ethernet cable is quadruple-shielded and has extremely good noise immunity. Further, Ethernet-compatible fiber-optic systems offer complete noise immunity.

Another false assumption is

The Manufacturing Automation Protocol standard was developed specifically to meet factory floor communications requirements. The IEEE 802.4 token-bus protocol was selected as the foundation of MAP because it more effectively meets these requirements than the IEEE 802.3 (Ethernet) or 802.5 (token-ring) standards.

Factories have many unique characteristics that must be considered when selecting a communications network. The typical factory stretches over several square miles, operates within a harsh physical environment and contains many different industrial systems with real-time requirements. The token-bus standard, because of its token-passing pro-

## CON:

BY TONY HELIES

Special to Network World

tory communications. Two advantages of baseband are its large bandwidth and inherent flexibility.

In a broadband network, the

available bandwidth is subdivided into channels — MAP, for example, specifies three channel pairs — which allows more than one network to share a single cable.

Broadband also supports data, voice and video, which means the same cable can support, for example, a communications network, video monitoring system and energy management system.

Another advantage is that broadband networks can extend as far as 25 miles. This means a single network can support communications throughout the manufacturing complex without bridges or repeaters.

Second, broadband is more immune than Ethernet to signal interference commonly found in factory environments. Ethernet's baseband signaling operates at the same frequency level as ambient noise generated by machine tools, lathes and other factory equipment.

By contrast, broadband signals are modulated and translated to a higher frequency that is less susceptible to factory noise.

Baseband is also more flexible to configure. For example, a tap may be placed anywhere on a broadband network. By contrast, an Ethernet specifies a minimum distance of 2½ meters between nodes.

Finally, broadband has long been used in the cable television industry and is a readily available and reliable technology.

IEEE 802.4 networks are used for many applications that would be less efficiently served by Ethernet. For example, a leading manufacturer of aluminum forgings uses an IEEE 802.4 network for facilitywide networking. The manufacturing complex stretches through 15 buildings and contains energy-intensive, harsh industrial operations.

One network channel is used to support manufacturing administration, plant maintenance systems and floor controllers. A second channel supports an energy management system, and a third is used for computer-aided design and manufacturing engineering stations. The network allows any system in the plant to be accessed from a single location.

Since this manufacturing environment is machinery-intensive, Ethernet would be less efficient because of its susceptibility to ambient noise.

Also, a single Ethernet could not satisfactorily handle the processing load resulting from interconnecting the plant's entire data

## Is Ethernet sufficient for factory networking needs?

that token passing is deterministic in the sense that users are guaranteed access within a maximum time, and that because Ethernet doesn't use tokens, it can't deliver data reliably in the time required by real-time manufacturing equipment.

People who think tokens will circulate deterministically around token buses are overlooking the probability of errors — from which Ethernet, unlike the token bus, was built to recover robustly.

Further, the requirements for timely delivery of data in manufacturing automation are grossly overstated, and the ability of Ethernet to meet these requirements under heavy loads is underestimated. I question people who say manufacturing systems are designed such that they could become dangerous if network data is not delivered reliably through a kilometer of cable in a few milliseconds.

After building a 10M bit/sec broadband token bus, the MAP team didn't go back to accept Ethernet. Instead, it invented three new media and transmission methods, the most widely used of which is proposed to be a new,

See **Pro** on next page

tocol and broadband medium, provides optimal communications in this environment.

Token passing ensures deterministic access to the local-area net, as only a station possessing the token can transmit. The protocol also supports a four-tier message-priority scheme, which lets time-critical systems access the network first.

By contrast, Ethernet uses carrier-sense multiple access with collision detection, a contention scheme in which nodes listen to the line before sending. With CSMA/CD, the probability of collision, and thus retransmission, increases as network load increases. In a typical factory network, which supports hundreds of real-time devices, a deterministic access method is more efficient.

Unlike Ethernet, which uses baseband signaling, IEEE 802.4 also specifies a broadband medium, which is well-suited for fac-

*Helies is president of Concord Communications, Inc., a manufacturer of MAP-based local-area networks in Marlboro, Mass. He has over 17 years of experience in the computer and industrial automation industries.*

# Opinions

## ►TELETOONS — By Phil Frank

We offer a complete network package..  
We install the operating system, configure the software and when none of it works we find you a new job.



processing and manufacturing systems.

Further, Ethernet would not even support an energy management system. Finally, the amount of cabling required to network a 15-building complex would overwhelm Ethernet's distance limitations, even if repeaters were used.

One of the world's largest manufacturers of fuel consumption systems also uses an IEEE 802.4 network for process control. Workstations, engineering and quality control terminals use the network to access data from factory floor controllers. This data is collected and analyzed to achieve zero-defect production.

In conclusion, an IEEE 802.4 network is the optimal solution for factory communications.

The combined characteristics of token passing and broadband effectively meet the extended distance, noise immunity, flexible integration and broad utility required for real-time communications within a manufacturing facility.

It was the recognition of these factors, as well as practical experience, that made MAP's authors select IEEE 802.4 as the world's first standards-based network for factory communications. □

**Pro** from previous page  
slower local-area net technology called carrier band.

Whereas Ethernet was unacceptable because it is nondeterministic baseband, MAP now relies on its own carrier band, which is — guess what? — baseband by another name.

If extreme noise immunity is so important, and baseband doesn't have it, why is carrier band acceptable? And what about the assumptions of determinism?

Previous arguments about the relative determinism of token bus and Ethernet have assumed both were running at 10M bit/sec. But who can argue that a heavily loaded 1M or even 5M bit/sec carrier band MAP network can ensure greater probability of timely data delivery than a 10M bit/sec Ethernet?

The good news is that the fanatics are calming down. Media independence is already being achieved through the Corporation for Open Systems and the merger of MAP and Boeing Computer Services Co.'s Technical and Office Protocol.

The issue of how best to move packets around factories has been opened up, and Ethernet is getting its day in court. □

## DEPARTMENTAL SYSTEMS

BRIAN JEFFERY

# The IBM Rain Dance

In many primitive cultures, the Rain Dance was a central custom. Entire villages assembled, donned costumes and danced for hours, chanting — usually in vain — for rain.

For some time now, the public has been treated to an IBM Rain Dance aimed at creating demand for departmental systems and IBM 9370s. Chanted rumors are heard through the industry: IBM has 50,000 orders for the 9370, no, 100,000. They are the preferred departmental system. People are queuing up for them. Meanwhile, IBM has only a few hundred units out the door, and the press is frantically combing the land for the apparently mythical 9370 user.

Consultants help. They're forever defining what a departmental system should be and how personal computer users should be able to talk to mainframes.

The 9370 can do all this, they say. Gosh, it's just what we've been saying departmental systems should look like. There's a big market for departmental systems. Ergo, there's a big market for the 9370.

According to senior management in IBM's Systems Products Division, Big Blue sees the 9370 "opportunity area" as about 50% "small and medium business," 35% to 40% "distributed computing" and only 10% to 15% "departmental systems."

What, then, of the great IBM hype for departmental systems?

Some senior IBM managers will admit, reluctantly, that they don't really believe in them. IBM doesn't use departmental systems much internally. It uses many personal computers, but otherwise, it's mostly mainframes and the Professional Office System that handle office applications.

The picture gets more murky when the question is asked: "How many orders does IBM actually have for the 9370?"

Consultants and market researchers use the figure of 50,000, which was originally provided by IBM. With a little prodding, IBM management admits that, er, well, um, that's a round number. The backlog,

*Jeffery is managing director at the International Technology Group, a Los Altos, Calif.-based research and consulting firm specializing in the IBM market.*

they admit, is a little soft.

Much of that 50,000 figure consists of commitments, people who have been reserving a place in the order queue and who might not actually buy the things.

Even more disturbing for IBM is that a high proportion of the "orders" are replacements for 4331 and 4341 machines installed from 1979 to 1983. Many of these are still on lease — IBM didn't start making leasing unattractive until 1982 — and the 9370 is gleefully received as an excellent replacement.

The problem for IBM, of course, is that 9370 replacement orders will start dropping like a rock when the old 4300 base has turned over. It will be the final act of IBM's great rental-to-sales conversion push, which contributes to Big Blue's growth slowdown.

What, then, of those Fortune 500 accounts that are ordering 9370s by the thousands? IBM proudly points to 1,000-unit and 2,000-unit orders. But prod IBM some, and it will admit that a lot of these are multi-year orders.

IBM also inadvertently tipped its hand with the proud statement that production will be fully sufficient for demand in the fourth quarter. This is one of those inoffensive-looking statements that turn out, on closer examination, to be bombsHELLS.

No backlog by Christmas? In a few months, IBM will have filled a supposedly massive demand that has had a year to build up? From the way everyone was talking, it sounded as if 9370s were going to be rationed well into 1988. There's something rather suspicious about this.

It is obvious that the 9370 has been grossly oversold and that the whole idea of departmental systems is, itself, a rather tiresome exercise in hype resting on a very dubious foundation of reality. It is all reminiscent of a Rain Dance.

Fortune 500 companies use lots of minis. Sometimes they buy more; sometimes they replace what they have. Sometimes they use them in a way that might be described as "departmental systems." The IBM Rain Dance won't change any of that, one way or the other. □



NETWORK WORLD

# Features

June 29, 1987

## Special Section: ISDN

# Circuit strategies

*Uncertainties have many managers plodding the course.*

BY MARY JOHNSTON

Special to Network World

Long-term success in any technological endeavor requires that all participants weigh the risks and advantages of multiple alternatives.

The advantages of the Integrated Services Digital Network concept — to provide a limited set of user interfaces and protocols capable of supporting ubiquitous, feature-rich digital communications — are endorsed by all. However, the current lack of technological standards poses great problems and risks for managers attempting to plot long-term communications strategies.

Some companies are choosing to ignore ISDN until it's proven in the market. Others are investing extensive resources in technology trials. Many organizations are taking the middle ground, using the acronym in plans but still feeling uneasy about its yet to be demonstrated advantages.

*Johnston is a senior consultant with BBN Communications Corp. in Cambridge, Mass.*

Whatever strategy is being considered, it is likely to be an attempt to avoid investing in equipment and services that may soon be obsolete while having few hard facts on which to base an assessment.

The list of uncertainties regarding ISDN is headed by the following:

■ **Standards.** Organizations continue to bicker over ISDN services, functions and protocol coding. Users resist investing in technologies that may have to undergo extensive upgrades due to changes in standards. In particular, ISDN support for private packet data networks and local-area networks drags way behind specifications for voice services.

■ **International divergence.** Multinational companies are acutely aware of variations in North American and European communications standards. Users cannot be

guaranteed how well international ISDNs will interwork until the 1988 Consultative Committee on International Telephony and Telegraphy plenary session is concluded, codifying the international consensus on ISDN standards for the next four years.



■ **Enhanced services.** Early ISDN demonstrations have exhibited few unique applications. For the most part, they mimic services available through conventional technologies. Vendor scenarios for proposed value-added services are often predicated on ISDN being almost universally available, when in fact it will come first to isolated metropolitan "islands."

■ **Pricing.** No vendor in ISDN development, whether it is a local telephone company, long-distance carrier or customer premises equipment manufacturer, has provided detailed pricing information for ISDN. Lack of this information

*Continued on next page*

From previous page  
makes cost/benefit analysis impossible.

All of the above are solid reasons for skeptical responses to ISDN. And, indeed, they are precisely why both vendor deployment and user acceptance will be slow.

But despite the fact that ISDN is unlikely to really make a difference to most U.S. users until 1992 — perhaps 1990 in Europe — it has crossed over the planning horizon and now must be treated seriously.

Effective communications management and strategy requires planners to evaluate ISDN with healthy skepticism. They must design long-term network architectures that can take advantage of ISDN yet also enable the adoption of alternatives if ISDN fails.

#### A child of the telcos

To understand why ISDN looks as it does today, one must recall that it is the child of telephone companies: AT&T, the Bell operating companies and the national Post, Telegraph and Telephone administrations of Europe.

These organizations have been forced to develop ISDN in response to requirements for better operational and management support for public common carrier networks. Development has been tied closely to the fact that digital circuits have been largely unavailable in Europe until recently.

Consequently, ISDN will be introduced just as the European networks begin to make end-to-end digital services commercially available. The American telephone companies, by comparison, have supported digital services for some time via the digital data service network, which is maintained separately from the basic dial-up network.

Given that the bulk of money spent on communications goes to voice services, it is not surprising that early ISDN standards efforts have made voice, or circuit-switched, networking the top priority. And, given the domination of international standards activities by the PTTs, it is not surprising that standards for premises equipment and interworking with private data networks were given low priority.

The insistence of competition-oriented U.S. companies has caused the CCITT to give priority to studying standards for issues such as private branch exchange-to-private branch exchange interworking, packet mode standards, schemes for merging public ISDNs and private local-area networks, and network interface standardization.

In some cases, such as PBX-to-PBX links, the standards will build on protocols already developed. In other cases, such as interworking with packet networks, the current thought is to develop a slow evolutionary path.

Packet mode standards are a particularly sensitive issue. The U.S. market supports a large number of private packet networks,

while many European countries have only one public packet option. Current U.S. ISDN/packet connection standards efforts, on which the current ISDN trials are based, rely on circuit-switched ISDN connections to non-ISDN packet handlers owned by the packet network, not the telephone network.

The only ISDN element is the use of the Q.921 and Q.931 protocols for the setup and tear-down of the circuit-switched connection.

Current standards call for true packet-switched connectivity as

## Despite the fact that ISDN is unlikely to really make a difference to most U.S. users until 1992, it must be treated seriously.

packet handler modules are added to ISDN central systems.

Interconnection of ISDN-based equipment and local networks is a more difficult issue. The 1.5M bit/sec-to-2M bit/sec range primary rate of ISDN is greatly outstripped by the throughput supported by local nets. That throughput is currently 10M bit/sec and will soon approach 100M bit/sec as use of fiber-based local net technology grows.

Standards for local-area networks and ISDN interworking are likely to stagnate until wideband ISDN channels are defined.

As the 1988 CCITT plenary approaches, the U.S. delegation will be quite active in requesting that attention be paid to these issues.

However, the PTTs in the CCITT membership may prefer to allocate resources for improving telephone company functionality, rather than worrying about private network issues.

Consequently, it is difficult to determine how many U.S. priorities will be addressed.

Should significant issues be ignored by the CCITT, the North American standards groups such as T1D1 may be forced to issue their own North American subset of ISDN standards.

These would only be binding on equipment developed for the North American market. This could result in significantly different North American and international ISDN functions and capabilities between 1988 and the following CCITT plenary in 1992.

For multinational users, such a move would eliminate any hope of unifying American and European equipment procurements. For vendors, it would increase the amount of money needed to be invested in ISDN development, raising user costs and slowing development of

enhanced features.

#### Networks can't wait

The business requirements of corporate telecommunications cannot wait for the deliberations of international standards groups. Many organizations are racing to install integrated T-1 backbones, local-area networks, intercompany data networks, integrated voice/data management systems and a vast array of other solutions to existing problems. For the most part, these solutions are dependent upon equipment using proprietary, non-ISDN-based protocols.

Even the BOCs, which have the most to gain by steering clients toward ISDN, are offering alternatives. While Pacific Bell has been planning its Bay Area ISDN trial for July 1987, it has also been actively testing Project Victoria, an "integrated" residential service, which bears no resemblance to the ISDN standards.

ISDN calls for a basic 2B + D interface — two 64K bit/sec data channels and one 16K bit/sec signaling channel — to replace the line into most residences. The Project Victoria interface provides for up to seven different information channels: two for voice, one for medium-speed data and four for low-speed data.

Its goal is to provide residential users with a wide array of entertainment and personal electronic services, including data base access, home banking, meter reading and others. The service is based on existing multiplexing technologies and does not use any ISDN protocols.

BellSouth Corp. offers a similar multiplexer-based alternative aimed at business applications via its Simultaneous Voice and Data

## Even the BOCs, which have the most to gain by steering clients toward ISDN, are offering alternatives.

Service. However, due to a recent FCC ruling requiring that the Project Victoria multiplexer be treated as customer premises equipment, rather than as an element of the BOC network, previously scheduled market trials are on hold.

As ISDN is introduced, the BOCs must decide upon pricing incentives to steer users toward ISDN or to proprietary multiplexer-based services, as appropriate.

Users with low-speed data requirements may find that the proprietary applications are more attractive financially and do not require the use of terminal adapters. These proprietary services are likely to play a transitional role, providing ISDN-like environments

to users while extending the useful life of existing terminals.

Interested users should scrutinize carrier ISDN pricing decisions and the price differential between ISDN and proprietary services. With the telephone companies hedging their bets, it would be wise for users to consider their alternatives.

#### Evolutionary technologies

The ISDN of the 1980s, featuring 64K bit/sec basic rate access, will not be the end of network technology development. Already under development are the 100M bit/sec Fiber Distributed Data Interface, 135M bit/sec-plus wideband ISDN and high-speed, hybrid circuit/packet switches.

But, telecommunications managers must make procurement decisions while these technologies are being refined. Users should plan for the ability to interwork with ISDN common carrier services and evaluate the role ISDN can play at the customer premises level.

In some cases, ISDN PBXs connecting integrated voice/data terminals may be preferable to separate PBX and local network wiring schemes, at least at relatively low data rates. In other cases, high-capacity dedicated local-area networks may be preferred. In either case, users should buy from vendors that have demonstrated plans for accommodating ISDN in the 1990s.

If a corporate decision is made in favor of ISDN, it is important that it be presented as a long-term strategy, not a solution to be enacted in 1987 or even in 1988. Users interacting with European networks will encounter some ISDN applications in 1988 and 1989, but most domestic users will see few of its benefits until 1991 or 1992.

From 1988 through 1991, ISDN will be given the opportunity to prove itself to American users. The majority of companies can learn from the few technological trailblazers, such as hamburger empire McDonald's Corp., that will be participating in ISDN trials during this period (see "Users reflect on ISDN trials," page 31).

The next two to three years will be an excellent period for considering ISDN's impact on corporate networks in the 1990s. Equipment bought today should be upgradeable, in case ISDN functionality is proven beneficial.

Over the next five years, many users organizations will opt for integrated environments. A good number of these will rely on T-1 backbones, supported by non-ISDN proprietary multiplexers and protocols. The aim will be, as it is today, to adequately support the business of the corporation in a cost-effective manner.

So long as there is a plan for smooth migration between these implementations, as well as between eventual ISDN standard protocols and interfaces, users should not have to suffer the costs of early equipment obsolescence.

With regard to ISDN, corporate planners should first focus on

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## Special Section: ISDN

# Users reflect on ISDN trials

*Early users judge the BOCs' initial integrated offerings.*

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Testing of advanced voice features has generally been held up because software supporting these capabilities is not yet available. ISDN trial participants with private branch exchanges don't seem to mind, however, because they're already familiar with promised voice features such as call forwarding and call waiting.

#### **What's hot**

The hottest ISDN voice application tested so far is caller identification. The calling party's telephone number is listed on the small display screen on the called party's

digital telephone set. If the called party is away from his desk, his telephone will indicate, on screen, that a message is waiting. The current drawback is that only individuals connected to the same ISDN switch can identify each other.

ISDN's ability to handle voice and data simultaneously is virtually taken for granted by trial participants. Although most trial users are testing integrated voice and data, many mentioned it as an afterthought. One popular application under evaluation is interactive editing, in which two users simultaneously view and update a document while discussing it over the telephone.

By contrast, few telecom manag-

ers are testing video applications. "The quality of the video right now is like communicating with Mars," says Murray Robertson, marketing planning administrator for General Telephone Co. of California. Intel Corp.'s Corporate Telecommunications Senior Strategist Donald Melvin, who tested videoconferencing as part of a Mountain Bell trial in Phoenix, agrees that the video now available over ISDN is not of commercial quality.

Melvin isn't giving up on videoconferencing, however. "We realize that a year from now the video compression algorithms will be twice as good as they are now," Melvin says. Intel had been looking

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into setting up a private ISDN network before being asked to participate in the trials, according to Melvin.

A more popular application is high-speed facsimile transmission. Earl Vogt, telecommunications manager at U.S. National Bank of Oregon, has tested Group IV facsimiles operating at 64K bit/sec with Pacific Northwest. Several telephone companies, including Mountain Bell and General Telephone of California, also plan to test high-speed facsimile during their internal trials.

Equal access for all

ISDN is creating the most excitement, however, in its ability to provide ubiquitous access. Trial participants are impressed with the sheer range of equipment that ISDN can connect.

The State of Arizona's Department of Administration, another Mountain Bell trial participant, exemplifies this: The agency is using ISDN to link just about every conceivable combination of computers and terminals.

Connections in this trial include mainframes to minicomputers, minicomputers and mainframes to asynchronous terminals, mainframes to personal computers and 3270 emulation.

Many of these connections are made using terminal adapters,

with communication occurring over the B channel, says Matthew Whittington, communications network engineer in the Data Management Division of the Department of Administration.

For terminal-to-mainframe communications, Whittington is also testing X.25 for use over both the B and D channels. The packet-switching technology allows for shorter sessions with the host, which means more terminals are able to share one front-end processor, Whittington says. In addition,

sources. Packet switching offers some great features, such as precise billing information."

Speeds are impressive

Like Whittington, many other trial users are enjoying the increased data transmission speeds and line consolidation ISDN provides. "I'm impressed with the baud rate increase," says Emil Karau, manager of telecommunications networks at Honeywell Bull, Inc.'s Phoenix operation. Honeywell cut over roughly 40 ISDN

points at the second site via ISDN lines. "Instead of using three or four private circuits, we're using one ISDN line," Karau says.

Intel also began its trial in the Phoenix area in February, says Melvin. "Users are happily using ISDN as if it were their one and only way of communicating," Melvin says. "Some of them are a little hesitant to give it up because it improves their service considerably."

The Intel users who have seen the biggest performance jump are those whose terminals were previously tied via coaxial cable to a local cluster controller. The controller was, in turn, linked to a remote host via a 56K bit/sec line. As a result, the 32 users whose terminals were hardwired to the controller had to share a single 56K bit/sec line.

Now, users' terminals are tied directly to an ISDN line. Using an AT&T product that Melvin calls a throttle-down device, the data stream from the 3270-type terminals is put onto the ISDN line at 64K bit/sec. The data travels to the central office, where it is switched to the remote host computer. A second throttle-down device sits in front of the cluster controller, which is now channel-attached to the host.

"Each user now gets more bandwidth than the whole cluster controller used to get, so the response

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## ISDN is creating the most excitement, however, in its ability to provide ubiquitous access.

packet switching provides both security and a way to account precisely for mainframe usage.

"Sharing is a key word for us — it's something we look for in our trial applications," Whittington says. "We're looking for ways ISDN can be configured to become a highway for people wanting to access our data centers. Using ISDN, we can manage, with great precision, not only the physical connection, but the necessary accounting and security that comes along with managing shared re-

lines in February. Two facilities seven miles apart are linked, and ISDN lines have replaced dial-up lines used to communicate between the two sites.

"Our normal dial-ups are 1,200 baud," Karau notes. "We're now running 9.6K baud, so you're looking at an eightfold increase in the transfer rate."

In addition, computers at one site that are responsible for building control, including monitoring of fire and temperature sensors, also control environmental check

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